BRITISH MEDICAL JOURNAL

LONDON SATURDAY SEPTEMBER 14 1940

LOCAL ANAESTHESIA IN GENERAL SURGERY

BY

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Serious interest in local anaesthesia was aroused during a visit to Budapest when Professor Adam said: "I have performed over 40,000 operations under local anaesthesia and I have never had an anaesthetic fatality." He had performed a cholecystectomy, a partial gastrectomy, a thyroidectomy, and an operation for secondary empyema under local anaesthesia with superlative dexterity and daintiness of surgical technique.

Previously local anaesthesia had been regarded as of limited usefulness in major surgery. It had been seen used in dilettante fashion in Britain, mostly for small procedures, while in major cases it was often supplemented to such an extent that the "local" became the very junior partner of the anaesthesia. A few large operations under local anaesthetics had been witnessed, but they were not painless or convincing. The Hungarian patients, hospital and private, walked or were wheeled in chairs into the theatre (including the exophthalmic goitre patient), so that the pre-anaesthesia was slight. On no occasion was the local assisted by a general anaesthesia or by other measures. The patients were visited afterwards and the highest pulse seen was 92, although clearly they were poorer surgical risks than London people.

Local anaesthesia is not new; but in Britain, at any rate, it is seldom regarded as the method of choice. Its use on the Continent is much wider, whilst in traumatic surgery Böhler's technique is classical.

Local anaesthesia has been practised by us since May, 1937, and our experience and the pertinent points arising out of it are here recorded. It took a year to develop the method with regard to patient and assistants, and to acquire the mental restraint, manual deftness, and precision necessary.

Points from Professor Adam's Technique

He used a 2-c.cm. syringe to infiltrate the skin and one of 5 c.cm. for the deeper tissues. The needles were of the fine short hypodermic type throughout. The anaesthetic medium was pantocain (decicain) 1 in 1,000. Professor Adam explained that this drug lies midway between novocain and percaine in its characteristics. Thus novocain 1/2 to 1 % acts immediately and lasts for forty to sixty minutes, and is practically non-toxic. Percaine takes a quarter of an hour to act, anaesthetizes for four to six hours, is toxic, and is effective in dilutions of 1 in 1,500. Pantocain anaesthetizes for two to three hours in five minutes, and is but slightly toxic. The volume usable with safety is 150 c.cm. of 1 in 1,000 solution and ten minutes later a further 150 c.cm.; this is ample for the largest operation. The nearer the brain the operation is the smaller the amount of local anaesthetic which can be injected with safety, as it is quickly absorbed into the general circulation and exerts its toxicity. In the leg up to 400 c.cm. can be used, but in the neck—for example, for thyroidectomy—only 60 c.cm. should be inserted initially, and then cautiously.

In abdominal operations the splanchnic ganglion was not injected directly, but 30 c.cm. was inserted in the middle line at the upper border of the pancreas, about the splenic artery. Finsterer inserts 30 c.cm. of 1/3 to 1/2 % novocain into the splanchnics (private communication).

Personal Experience

Formerly Gray's 50-c.cm. syringe was used to inject local anaesthetic, but making the injection so fatigued the hand that the procedure became irksome and was soon discontinued. The 5-c.cm. syringe is a great advance: the insertion is physically easy and the light weight allows of precision in estimating the exact location of the infiltration. An addition is a two-way valve on the syringe which is connected by a tube to a bottle of pantocain. This avoids interruption for reloading and also external contamination, so that the sterility of the fluid is certain; nevertheless, two 5-c.cm. syringes charged by the assistant work quickly and smoothly.

The early experiences were humiliating, partly from lack of faith and skill and partly because of the incomplete infiltration of the operation area. The abdomen was successfully opened and a stomach or gall-bladder operation done in "heavy weather," whilst the exploration was inadequate and difficult. Closure of the peritoneum was an ordeal (the anaesthetist described it as a tea-party), and sometimes a complete general anaesthetic was required to achieve it. With practice the method has become effective, and the opinion we now hold is that in the majority of cases a local anaesthetic is preferable and safest. Bleeding is minimal, the breathing is tranquil, straining is eliminated, the blood pressure is less disturbed than by other types of anaesthesia, and the general condition is optimal throughout.

Another advance was the addition of a colour to the local anaesthetic, making it green or blue. This stains the tissues and indicates exactly how far the anaesthetic has penetrated: thus where there is no colour there is no anaesthetic and therefore no anaesthesia. Two dyes have been used. The first, kiton fast green V, was supplied by Mr. Arnold Sorsby, one drop of the 10 % solution added to 8 oz. being sufficient to tinge the tissues green. No biologically standardized preparation of this textile dye is yet on the market. The second was indigo-carmine, as injected for chromoscopy, suggested by Mr. Kenneth James; a few drops are added until the fluid is

medium blue. No ill effects such as sepsis or delayed healing have been observed, and the helpfulness of these dyes is undoubted.

The Pre-anaesthetic for Local Anaesthesia

The pre-anaesthetic for local anaesthesia has been standardized in adults to: omnopon 1/3 to 2/3 grain, hyoscine 1/150 to 1/100 grain. For children it is morphine 1/75 grain for each year of life. Most subjects are rendered drowsy or, at any rate, indifferent to their surroundings. Where this effect has not been produced another 1/3 grain of omnopon may be given in the theatre. A long period of trial of pre-anaesthetics since 1932 has shown the variableness of other remedies, and experience finally crystallized in the twin injection. It is simple and safe to administer, it minimizes error, and it allows of accuracy in assessing results. Each person, however, is considered individually. Heavy morphinization is a fertile cause of post-operative vomiting.

Supplementary Anaesthesia during Operation

The local anaesthesia has been supplemented by various general anaesthetics in order to eliminate the psychical trauma, as indicated by tension and clutching of the fingers. Several media have been used for this purpose.

1. *The Minnitt Gas Apparatus for Midwifery.*—This was successfully employed in a series of cases. Patients were somewhat averse to administering the gas themselves, but the instrument is of real help and can be used by one inexperienced in gas anaesthesia.

2. *Gas and Oxygen.*—Gas and oxygen have been given for periods of twenty seconds up to the duration of the operation. There is an understandable desire by the anaesthetist to give a full anaesthetic, to insert an airway, and occasionally to mop out the throat, etc., thus carrying the risks of a straight general anaesthetic, with little advantage except that the patient is saved psychical trauma. The respiration is jerky and the abdominal muscles are tightened; it is an interesting fact that these effects disappear when the inhalation anaesthetic is stopped. In a number of cases gas had been administered during the minute or so necessary to explore the abdomen, as in a partial gastrectomy or gall-stones. In infants and in apprehensive persons whose self-control and co-operation are doubtful a whiff of gas is given for a few seconds while the appendix is delivered from the abdomen. Latterly it has seldom been required, especially when the incision is adequate: thus local anaesthesia has proved the superiority of the plain incised oblique right iliac incision (not the gridiron) over all others for appendicectomy.

An important effect of gas-and-oxygen anaesthesia by the ordinary closed circuit, with or without an absorber, is that the abdomen becomes rigid and can scarcely be closed until it is stopped, when the respiration becomes tranquil and the abdominal wall soft, otherwise the anaesthesia must be pressed to a full surgical degree by ether. Similar tight abdomens preventing suture of the peritoneum by straining and evisceration were caused by giving oxygen through a mask strapped to the face; this condition also occurred in an edentulous woman who had had an airway left in the mouth after cyclopropane for thirty seconds during a laparotomy for cancer of the rectum. In each case the removal was followed by silent rhythmic breathing. These effects are important in operations under local anaesthesia. The ordinary airway is particularly potent in causing rigidity.

3. *Pentothal and Evipan.*—Pentothal is an efficient additional anaesthetic. It is given either continuously or during the few seconds required for a laparotomy. Seldom has more than 1 gramme been used, and then in an operation lasting nearly three hours; 0.5 gramme is the average amount. Evipan has been similarly employed. Patients like the method, and many have awakened inquiring when they were to have their operation. Pentothal and evipan avoid mechanical interference with the respiratory tract or mouth; no respiratory or cardiac weakness or failure has been noticed. They are given after the peritoneum is opened, preparatory to the sympathetic injection and exploration. After the initial dose to cause unconsciousness (3 to 5 c.cm.) they are trickled in 1 c.cm. at a time, as needed. This has no effect on the blood pressure, but several c.cm. given quickly will cause a prompt fall.

A disadvantage of the method is the difficulty in finding and entering a vein at the instant it is required—that is, when the fingers are noticed to twitch or flex or the patient sighs. This obstacle is overcome by inserting a slow-drip intravenous saline at the start of the operation, and injecting as required into the rubber tube near to the needle or cannula in the vein. Another small objection is a slight duskiness due to defective aeration: keeping the jaw forward and the inhalation of oxygen correct this and also extend the effectiveness of the drug. Pentothal is the supplementary agent of choice, being by far the most efficient. The use of continuous evipan caused pronounced duskiness, jactitation, some rigidity, and post-operative excitement, and we no longer give this drug.

Apparatus used for Local Anaesthetic

The pantocain 1 in 1,000 is contained in an 8-oz. one-orificed babies' feeding-bottle (glass stands boiling). It is secured by a rubber vaccine cap which has been perforated once. The colouring agent is added, and sterilization is done by autoclaving in a dressing drum or by boiling in an instrument sterilizer. Neither procedure affects the anaesthetic or the colour. (With me, novocain 1/2 % has decomposed on boiling and is useless, although Farr (1929) states that it stands 100° C.) Time must be allowed for cooling to body temperature before use.

At the operation the rubber cover is removed and 1 minim of adrenaline per 1 oz. of anaesthetic is added. A stopper with two tubes through it (as generally used for open ether drip) which has been boiled is plugged in, pressure tubing is fitted to connect it with the two-way valve of the syringe, and the apparatus is complete. The container lies on the instrument tray, which usually stands over the patient at operation.

The surgeon, assistant, or anaesthetist proceeds with the infiltration without further help and with the assurance that the medium is sterile and cannot be contaminated by air or by the powder off the gloves. The pantocain must be filtered before bottling and the receptacle be quite clean, for the smallest particle of foreign matter may block the fine No. 17 needles, which have proved just right for the injection. When the syringe is not in use it hangs on one of the hooks of an Ogilvie stand (Fig. 1).

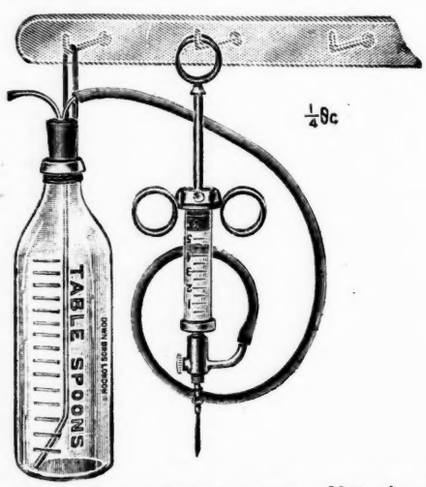

FIG. 1.—The local anaesthetic apparatus. Note the simplicity and the 5-c.cm. syringe.

Injection of Local Anaesthetic

The method employed has been a combination of direct local infiltration and a regional field block. The steps mentioned here apply mainly to the abdomen; the needle throughout has been a No. 17 hypodermic seven-eighths of an inch long. The injections require little muscular effort; 2½ to 3 c.cm. is inserted under the skin for the length of the needle and another 2½ to 3 c.cm. is placed while slowly

passing vertically down into the muscle. In most subjects this reaches the peritoneum through the muscle sheath, but in stout patients a needle one and a quarter inches long is required. The small syringe and the fine needle permit a delicate touch which transmits the resistance of the various fascial layers.

In the abdominal cavity the creeping technique is used: it has been found more satisfactory than the splanchnic injection. Partial gastrectomy, gall-bladder operations, anastomosis of the intestine or the colon, nephrectomy, apperdicectomy, and herniae have been smoothly performed. At the end of a long intra-abdominal procedure of two to three hours closure is sometimes difficult owing to a tight abdominal wall, but a reinjection of the anaesthetic into the muscle and peritoneum overcomes this satisfactorily. There is a natural temptation to try to finish without stopping for the anaesthetic, but its use is entirely worth while.

The technique has been acquired quickly by house-surgeons and anaesthetists, thus expediting operating sessions.

Blood-pressure Readings during Operations under Local Anaesthesia

Since 1932 at most of our major operations blood-pressure and pulse charts have been made and much valuable and illuminating information has been gained concerning the changes that occur during surgical procedures. Thus the variations of pressure at an operation performed under spinal anaesthesia are precipitate rises and falls which can to some extent be modified by a preliminary injection of 1 grain of ephedrine, but even then the curve is one of oscillations. The readings taken during general anaesthesia show graphs that can be likened to pictures of the Alps. A feature of operations performed under local anaesthesia is the steadiness of the systolic and diastolic pressure and the pulse readings: the more painstaking the infiltration the steadier they are (Figs. 2–5).

ILLUSTRATIVE CASES

Case 1.—The patient, a woman aged 30, had a posterior gastro-enterostomy performed for chronic duodenal ulcer.

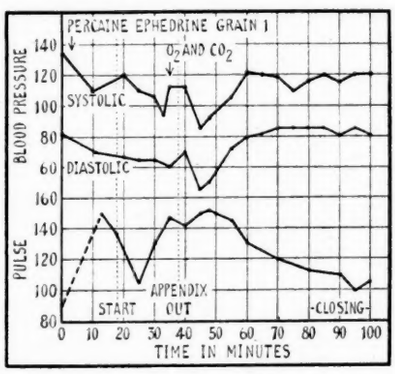

FIG. 2.—Case 1: Operation record for gastro-enterostomy (spinal anaesthetic).

For premedication she was given 2/3 grain of omnopon, 1/150 grain of scopolamine, and 0.85 c.cm. of coramine. The spinal anaesthetic used was percaine, 14 c.cm. of a 1 in 1,500 solution. The operation began about a quarter of an hour after the spinal anaesthetic had been given. Fig. 2 gives the blood pressure and the pulse rate.

Case 2.—Fig. 3 shows the blood pressure and pulse rate of a gastro-enterostomy done under a general anaesthetic. The case was that of a man aged 71 with a pyloric ulcer. He was given 1/3 grain of omnopon, 1/150 grain of scopolamine, and 0.85 c.cm. of coramine as premedication, the anaesthetics used being gas, cyclopropane, and ether.

Case 3.—This patient, a man aged 63, had duodenal ulcer with pyloric narrowing. Posterior gastro-enterostomy and appendicectomy were done under local anaesthesia and pentothal. Fig. 4 shows that the blood pressure and the pulse rate ran a steadier course than in the previous two cases.

Case 4.—The patient, a man aged 58 with a chronic gastric ulcer, had a partial gastrectomy (Billroth I) performed under local anaesthesia with pentothal. The pulse rate and blood pressure were remarkably steady (Fig. 5).

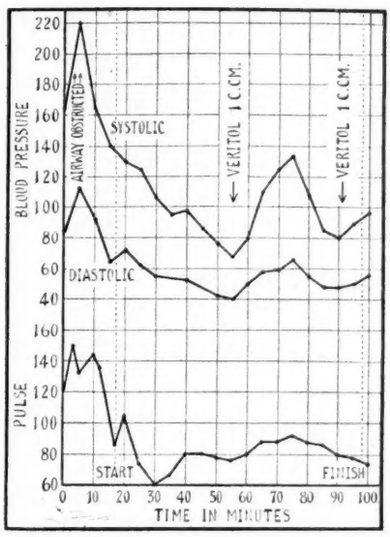

FIG. 3.—Case 2: Operation record for gastro-enterostomy (general anaesthetic).

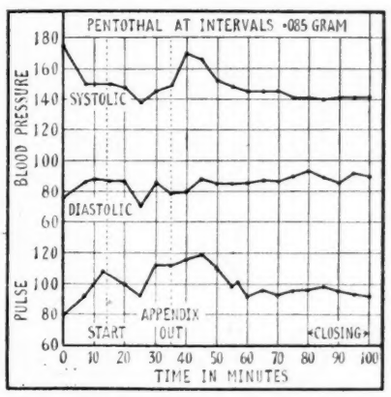

FIG. 4.—Case 3: Blood-pressure chart made during operation for gastro-enterostomy (local anaesthetic with pentothal).

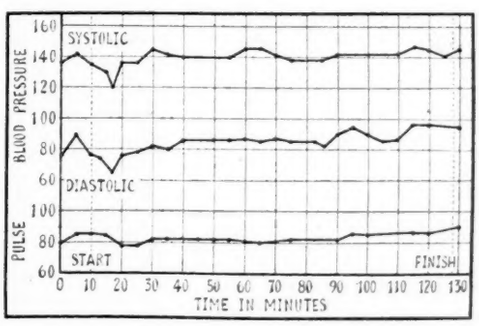

FIG. 5.—Case 4: Operation record for partial gastrectomy (local anaesthetic with pentothal).

Reaction of Patients to Local Anaesthesia

An operation performed under local anaesthesia is not readily acceptable to the average British patient, who expects to be "put under" and go to sleep. A few are glad not to be forcibly rendered unconscious and are interested and co-operative in the experience. The main body of patients prove amenable when the position is carefully and sympathetically explained beforehand. With

the pre-anaesthesia detailed for each patient and a timely shot of pentothal or whiff of gas and oxygen the local anaesthetic is robbed of its terrors. Some patients have declared that they would not wish for any other method.

The After-progress

After the average major operation patients are well mentally and physically. The day after operation they are obviously subdued, with a raised pulse rate, but thereafter progress is uneventful. There is a complete absence of the anxious, suffused, and chesty facies and of headaches, and seldom is there any vomiting. The old troubles of the post-operative chest—cough and hiccup, distension of the abdomen, and retention of urine—have practically disappeared. A former house-surgeon said: "Every case of partial gastrectomy done under a spinal or general anaesthetic had a cough of some sort about the third day, but not these patients done under local." Another said concerning partial gastrectomy subjects under local anaesthesia: "After the first day they recover 'like an appendix.'"

An early disadvantage experienced was that a few wounds broke down superficially and healed slowly, which was considered to be due to adrenaline in the anaesthetic: 2 minims per 1 oz. was then used. This was reduced to 1 minim per 1 oz., and healing has since been perfect, even in carcinomatous subjects.

Several operations were on children; these passed off smoothly, and the recoveries were uneventful. A whiff of gas was given during the intra-abdominal manipulation, lasting in each case less than a minute. The proceedings were explained to the children with the same courtesy and detail as to an adult, and they co-operated admirably.

TABLE I.—*367 Cases Operated on Mainly under Local Anaesthesia (September, 1937, to April, 1940, inclusive)*

Local infiltration only	194
" " plus gas and oxygen	90
" " " pentothal or evipan	62
" " " light open ether	12
" " " auto-administration of gas (by Minnitt gas apparatus)	9

TABLE II.—*The Cases Detailed*

Acute appendicitis	49	(no deaths)
Ligature and injection of varicose veins (groin and knee—many bilateral)	39	
Hernia, radical cure	37	
Partial gastrectomy	40	
Cholecystectomy with drainage of common bile duct	27	
Laparotomy and colostomy	13	
Laparotomy and chronic appendix	33	
Steinach II ligature	12	
Thyroidectomy (toxic goitre)	11	
Suprapubic cystostomy	11	
Meatotomy, circumcision, or amputation of penis	10	
Gastro-enterostomy	9	
Carcinoma of recto-sigmoid junction (Hartmann's operation)	8	
Operations on the kidney	7	
Perforated peptic ulcer	4	
Lobectomy for simple tumour of breast	5	
Prostatectomy	4	
Tuberculous glands of neck	4	
Cholecystgastrostomy	3	
Radical excision of the breast for carcinoma	3	
Fractured patella	4	
Intestinal obstruction	4	
Chronic appendicitis	3	
Operations on uterus and ovaries	2	
Carcinoma of bladder: partial cystectomy	1	
Subacute osteomyelitis of skull: resection of area of skull	1	
Various minor operations	23	

All emergencies have been done with local anaesthesia whenever possible: the mortality and complications have been reduced and the after-progress has largely been uneventful.

Conclusion

In order to operate effectively under local anaesthesia the following points must be observed:

The anaesthetic must be injected into the entire operation area. This is so obvious as to seem redundant, but the need is often forgotten, and the surgeon is reluctant to stop operating, with the consequence that pain, straining, groans, and dissatisfaction result. "Taking a chance" that a part is insensitive is mostly unsuccessful.

The surgeon must wait for the anaesthetic to act; therefore operations under local anaesthesia, especially in the early stages, last longer than those under general or spinal; but later, taking the induction period into account, the difference in the time is not so wide.

A precision of technique and a daintiness are exacted which are unnecessary with the conventional methods. The tissues are divided by cutting instead of tearing and stripping, and swabbing must be minimal. A measure of discipline and control is required from the surgical team that is not necessary with the usual anaesthetics.

Local anaesthesia cannot be popular in teaching hospitals, for students must have anaesthetic practice; but where there is not this additional responsibility, continued use has crystallized in the opinion that for most operations of general surgery local anaesthesia carries the maximum of safety to the patient.

Summary

Personal experiences of the use of local anaesthesia practised since May, 1937, are given, together with the salient points that have arisen.

Pre-anaesthesia and supplementary anaesthesia are dealt with.

General, spinal, and local anaesthesia are compared in their effects on the blood pressure and pulse rate.

Points to be observed in operating under local anaesthesia are stressed.

REFERENCE

Farr, R. E. (1929). *Practical Local Anaesthesia*, p. 72, Philadelphia.

CEREBRAL THROMBOPHLEBITIS

BY

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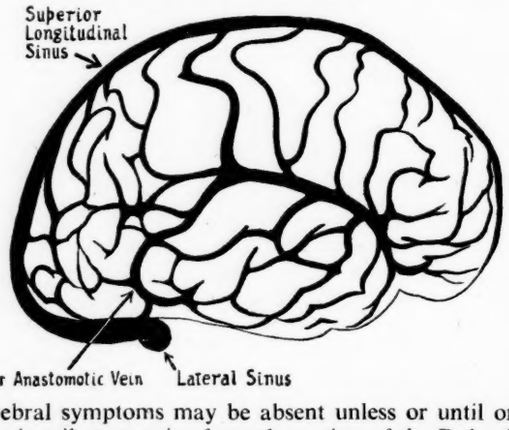
Thrombophlebitis of the superficial cerebral veins is a well-recognized complication of otitis media. Courville and Nielsen (1934, 1935, 1937) believe that the pathway of infection is as a rule by way of the lateral sinus. Thence the thrombosis may spread upwards into the superior longitudinal sinus and so downwards into tributary veins, or it may take the path offered by the inferior anastomotic vein (vein of Labbé), which opens at one end into the genu of the lateral sinus and at the other end into the superficial middle cerebral vein (see Figure). In either



case cerebral symptoms may be absent unless or until one of the main tributary veins from the region of the Rolandic fissure is involved. There is then a rapid onset of weakness or paralysis, often preceded by focal epileptic attacks.

If the clot is aseptic there may be no evidence of constitutional disturbance. Thus, in a patient with otitis media the sudden onset of focal symptoms—fits or paralysis—may be the first evidence of an aseptic thrombophlebitis beginning in the lateral sinus and spreading by one of the pathways described to the cortical veins (Symonds, 1937). Either pathway must traverse the subdural and subarachnoid spaces. If, therefore, there are organisms in the clot, subdural abscess or leptomeningitis may result. As a more frequent complication an abscess of the brain may develop in the zone of cortical thrombophlebitis. In a great many cases, however, these hazards are escaped, the spread of the thrombophlebitis ceases, collateral veins soon provide an adequate circulation, the affected area of cortex recovers its function, and the symptoms rapidly disappear. If the pathway of spread has been along the superior longitudinal sinus, increased intracranial pressure may result either from venous engorgement or from accumulation of the cerebrospinal fluid, which normally drains into the great venous sinuses through the arachnoid villi. So long, however, as the clot remains aseptic, organization and canalization will restore the normal circulation, and these symptoms also will disappear.

It is well known that thrombosis of the lateral sinus may also result from direct spread of infection from the tonsil or nasopharynx, and again may be symptomless so long as the clot is aseptic. I have recorded a case of right peritonsillar abscess in which the patient developed a left facio-brachial monoplegia, followed by the signs of increased intracranial pressure, with spontaneous recovery; the assumption being that an aseptic thrombophlebitis of the right lateral sinus had extended along the superior longitudinal sinus to involve the right superficial middle cerebral vein. Thrombophlebitis may also develop in the *anterior* end of the superior longitudinal sinus from direct spread of infection in the nose or accessory air sinuses and extend *backwards* to involve the tributary veins. Again, if the process is aseptic, fits or paralysis may be the first clinical evidence of this happening. The direct spread of infection, however, is not the only cause of aseptic thrombophlebitis of the dural sinuses and their tributary veins. This may occur as the result of a generalized liability to thrombophlebitis in certain states of infection or malnutrition. Whenever, therefore, there is a sudden development of cerebral symptoms in a patient with thrombophlebitis elsewhere in the body, or in the course of an illness in which thrombophlebitis is known to be common, the possibility of this occurrence in the dural sinuses or cerebral veins should be considered.

The object of the present communication is to record five cases in which the diagnosis of cerebral thrombophlebitis appeared reasonably founded. In two instances the cause was direct spread of infection from frontal sinusitis, and in another it was direct spread (presumably) from the nasopharynx. In the other two cases the symptoms developed after parturition at a stage in which thrombophlebitis elsewhere in the body is common. In one of these cases the diagnosis was confirmed at an exploratory operation.

Frontal Sinusitis: Case I

A youth aged 17 years 8 months developed influenza complicated by acute right frontal sinusitis on March 16, 1938. The sinus was drained by external operation on March 21. Pain was at once relieved, and within forty-eight hours the temperature, which had been high, returned to normal. The wound drained satisfactorily; the patient felt well in himself, and ate well. On March 25 his mother noticed that he was apathetic. No other abnormality was noticed until 4 p.m. on March 26, when he was about to use the bed pan; he then found that he had lost power in the left leg and was weak in the left arm. There was no headache, vomiting, or rise of temperature.

When I saw him at 9 p.m. he was quiet, alert, and sensible. The fundi showed marked engorgement of the retinal veins. There was no weakness of face, palate, or tongue. There was slight falling away of the extended left arm, the left hand-grip was weak, and movements of the left fingers were slower than those of the right. The left lower limb was completely paralysed at all joints and flaccid. No sensory impairment of any part to light touch, pin-prick, or tests of postural sense could be discovered. The arm-jerks, knee-jerks, and right ankle-jerk were absent, the left ankle-jerk feebly present; the right abdominal reflexes were normal, the left feebly present; the right plantar response was flexor, the left extensor. Lumbar puncture showed clear fluid with a pressure of 300 mm. The fluid contained 13 cells per c.mm., of which 96% were lymphocytes and 4% polymorphs. The protein was 50 mg. per 100 c.cm.; the Nonne-Apelt and Pandy tests were weakly positive.

The diagnosis made was thrombosis of the superior longitudinal sinus together with a tributary vein. It was considered that the good general health and absence of rigor were excellent prognostic points. No further treatment was considered necessary.

On March 28 Dr. R. E. Smith, who had care of the patient, reported complete recovery from the paralysis. I saw the patient again on April 3 and found no abnormal signs in the nervous system except a little slowness of independent movement in the left toes. The temperature had remained normal and the general condition good. On April 5 Dr. Smith reported that in the course of an hour or two the patient had again developed weakness of the left limbs, amounting to paralysis of the foot, weakness at knee and hip, and slight weakness of the arm. There was no headache, vomiting, or drowsiness, and the temperature was normal. It was considered that there had been an extension of the thrombophlebitis, but with no evidence to suggest abscess formation. The weakness this time persisted without change until April 12. The cerebrospinal fluid was examined on that day and showed 5 cells per c.mm., of which 8% were mononuclears, some of them with granular inclusions (? blood pigment). No polymorphs were seen. The protein was 40 per 100 c.cm. Dr. Greenfield examined the fluid and gave the opinion that the slight excess of cells might be explained by the after-effects of a sinus thrombosis.

On April 15 the patient found himself able to move his left toes, and in the course of the next few days he made a complete recovery. He has since remained perfectly well.

Comment.—This case illustrates well enough how quiet may be the period during which thrombosis is extending. The onset of paralysis on the first occasion was sudden; the recovery so rapid that it could hardly be explained except in terms of anastomotic circulation. On the second occasion, as might be expected, the re-establishment of circulation, and therefore of cortical function, was slower, but none the less complete. The abnormalities in the cerebrospinal fluid were characteristic of an infective cortical thrombophlebitis. The distribution of the paralysis—leg affected severely, arm slightly, and face not at all—is what might perhaps be expected when thrombosis spreads from the superior longitudinal sinus into a tributary vein. This distribution is, however, by no means constant.

Case II

A man aged 20 was transferred from an Air Force hospital to a military hospital for head injuries on February 22, 1940, on account of fits and right-sided weakness. The family and past history contained nothing of importance. The recent story was that three weeks previously he had had a cold and sore throat, with a purulent discharge from the right nostril. On February 12 he complained of headache, and on the 14th he was admitted to a R.A.F. hospital with evidence of an acute right frontal sinusitis. The temperature was 103°, the pulse 120. He was treated with sulphapyridine (M & B 693).

X-ray examination revealed a pansinusitis, with fluid levels in both frontal sinuses and both antra. The antra were washed out, and his condition improved. On February 19 his temperature fell to normal.

At 7 a.m. on the 22nd, shortly after he had been observed to be in normal health and about to eat his breakfast, he was found unexpectedly to be unrousable. The orderly officer was called, and when he arrived a few minutes later he found the patient cyanosed and generally convulsed. The epileptic attack lasted some minutes. At 7.50 a.m. while lying quietly unconscious he suddenly had another fit. There was generalized tonic convulsion, followed by clonic convulsion. The attack lasted two minutes. He was examined by Squadron Leader Brinton at 9.15 a.m. He was then conscious, but confused and slow. Examination revealed a slight weakness of the right lower face and the right upper and lower limbs, a grasp reflex in the right hand, and continuous twitching movements in the right forearm, hand, and anterior tibial muscles. The arm-jerks were feebly present and equal, the right abdominal reflexes diminished, the right knee- and ankle-jerks increased, the right plantar response feebly flexor, with fanning of the toes, the left flexor. At 3.45 p.m. Squadron Leader Brinton found him mentally alert. The physical signs were unchanged. The cerebrospinal fluid was under a pressure of 110 mm. and was reported to contain 62 cells per c.mm.—" probably granulocytes."

The patient was transferred to a military hospital for head injuries that night. The physical signs were unchanged. The white cell count in the blood was 7,725 per c.mm.—75% polymorphs. On the following day he was examined by Major H. S. Sharp, specialist in diseases of ear, nose, and throat, who reported that both frontal sinuses were draining well into the nose. As the patient remained well in himself and apyrexial it was decided not to explore the frontal sinuses.

On February 25 he awoke at 2 a.m. with a stinging sensation in the right leg from knee to foot and in the right arm from elbow to hand. He felt the right arm and leg slightly weaker. Twelve hours later the stinging sensation was almost gone from the right arm; it was present, though less severe, in the right leg. There was no fresh development of physical signs in association with this episode. In the course of the next week the abnormal physical signs rapidly disappeared and the nasal discharge ceased. He remained apyrexial and was free from headache. Improvement was maintained during the subsequent weeks, and he was ultimately discharged from hospital recovered.

In the earlier stages of this case abscess was suspected, and although a full review of the facts led to the diagnosis of thrombophlebitis the possibility of an abscess secondary to this process was kept in mind. Lumbar puncture was therefore performed at intervals, and the pressure and contents of the cerebrospinal fluid were as follows:

Date	Pressure	Cells per c.mm.	Type of Cells	Protein mg. per 100 c.cm.
28/2/40 ..	140	18	Lymphocytes	35
9/3/40 ..	130	20	"	25
16/3/40 .	115	12	"	10
29/3/40 .	115	5	"	10
12/4/40 ..	60	8	"	20
27/4/40 ..	125	0	—	50

Jugular compression was performed on each occasion and showed a normal rise of pressure from either side. There was therefore no manometric evidence of obstruction of the large dural sinuses.

Comment.—The following points in this case are worth mentioning: (1) The occurrence of bilateral convulsion in the epileptic attacks. This we know may occur with a lesion (for example, a tumour) confined to one frontal lobe. Another explanation, however, may be found in the assumption that tributary veins from both frontal lobes were occluded. (2) The decision, which proved a wise one, not to operate. The argument that so long as the sinuses were draining freely into the nose there was no need for operation proved its soundness. (3) That for several weeks after all symptoms and signs of the cerebral lesion had cleared up the pleocytosis in the cerebrospinal fluid continued.

Nasopharyngitis

That cerebral thrombophlebitis may follow an illness so trivial as nasopharyngitis at first sight appears unlikely. McAlpine (1937), however, has recorded, under the title of toxic hydrocephalus, cases in which the symptoms of increased intracranial pressure have followed such an infection, and it seems not improbable that in these cases thrombosis of the dural sinuses may have been the cause. It has already been remarked that the venous pathway from nasopharynx to lateral sinus is short and that many instances have been recorded of lateral sinus thrombosis following peritonsillar abscess. Once thrombophlebitis is established in a dural sinus there is no doubt that its spread may be extensive and symptomless. In the following case the diagnosis of cortical thrombophlebitis on clinical grounds seemed highly probable.

Case III

The patient, a boy aged 15, was admitted to a R.A.F. hospital on February 2, 1940. I saw him with Flight Lieutenant Denis Williams, who had care of the case and who has kindly given me his notes. The family and past history were uneventful. The recent story was that a fortnight before admission he was taken ill with sore throat, fever, sweating, and headache. He was ill for six days with an extremely sore throat and intermittent headache. A week before admission he picked up a mug with his left hand, but found he could not hold it. This weakness persisted. Two days later he could not control the muscles of the left side of the face, and on getting out of bed the left knee was weak and the leg dragged. These symptoms had persisted unchanged.

On admission he was mentally clear and alert. The fundi and fields were normal. He showed weakness of the left face, but none of palate or tongue. There was weakness of left upper and lower limbs, but no defect of sensation. The arm-jerks were present and equal, the left abdominal reflexes relatively diminished, the left knee-jerk brisker than the right, the ankle-jerks present and equal, the right plantar flexor and the left occasionally extensor. The cerebrospinal fluid showed a pressure of 120 mm. and contained 130 cells per c.mm., of which 70% were lymphocytes and the remainder red blood cells. The Wassermann reaction was negative in the blood and cerebrospinal fluid.

Following his admission the temperature remained normal. He was well in himself, and at the end of ten days the weakness began to improve, so that by February 20 he had practically recovered. On this day, however, he felt shivery, his temperature rose to 100.4°, and he complained of severe headache and nausea. At the same time there was a recurrence of weakness in the left face and arm, especially in the latter. The left arm-jerks were markedly increased; the left plantar response was doubtful. There were no other abnormal physical signs. By February 23 he had begun to improve again, though still complaining of headache. His temperature had remained normal since February 20. Subsequent recovery was rapid, and he was discharged well on March 8.

Comment.—This case is an example of the paralytic as opposed to the epileptic form of onset, and in some respects resembles Case I. The first onset of weakness was sudden. After an interval of two days there was a sudden extension of the weakness, and after a period of improvement there was a relapse associated with a brief rise of temperature. The pleocytosis in the cerebrospinal fluid was of the kind often seen in proved cases of cerebral thrombophlebitis, and it is difficult to envisage an alternative pathology.

Following Parturition: Case IV

For the notes of this case I am indebted to my colleagues at the National Hospital, Queen Square: Dr. Purdon Martin and Mr. Geoffrey Jefferson.

A married woman aged 32 was admitted to hospital on March 18, 1934, having had frequent left-sided epileptic attacks. On March 4 she had been delivered of her first child. Labour was uneventful, forceps being used in the third stage. The puerperium was normal except for a rise of temperature to 99° on the third day. On March 17 she complained of headache, and noticed a transient feeling of uselessness in the left upper limb. On the 18th, half an hour after waking, she had an attack in which the left arm and then the left side of the face began to twitch. She then lost consciousness for about two minutes, and was drowsy for some time afterwards. She had four more attacks of the same kind in the next five hours.

On admission the patient was drowsy and she complained of headache. There was no neck stiffness or Kernig's sign. The fundi were normal, as were all functions of the cranial nerves except those participating in a left sensorimotor hemiparesis, which was complete in the left upper limb, less marked in the face, and least in the lower limb.

In the first twenty-four hours after admission she had seventeen fits, all of the same nature. For five or six minutes there would be slight clonic movements of the left face and upper limb, with a tendency for the head and eyes to be pulled to the left. The movements generally gained in intensity, spread to the left side of the trunk and lower limb, and then became generalized, with loss of consciousness for two or three minutes. Her blood pressure on admission was 122/84. The general examination was negative. Lumbar puncture on admission showed the cerebrospinal fluid under a pressure of 130 mm. The fluid was slightly blood-stained and yellow, and contained 1,700 red cells per c.mm. with no excess of white cells. The protein was 45 mg. per 100 c.cm.; the Wassermann reaction was negative. During April, although there was some improvement in the hemiparesis, she complained a good deal of headache. By April 23 (five weeks after admission) she had 2D papilloedema in the right eye and 3D in the left, with a few small haemorrhages.

On May 6 lumbar puncture showed a pressure of 240 mm. The fluid was clear, with no cells, and the protein 50 mg. per 100 c.cm. There was continued improvement in the hemiparesis, but on account of the headache and papilloedema an exploration was decided upon. This was performed by Mr. Jefferson on May 24. The dura mater when opened was found to be adherent over the vessels in the Rolandic fissure. In this fissure there was a firm opaque whitish streak. Arterial pulsation was normal, and the impression was gained that what had been seen was a thrombosed vein. The pre-motor cortex looked gummy and softened, but electrical stimulation produced movements in the corresponding limbs.

The patient recovered from the operation, and was discharged on June 26 with only a slight weakness of the left upper limb and left side of the face. She subsequently made a complete recovery and has remained well.

Comment.—In this case it is to be presumed that the extent of the initial thrombosis in the cortical veins and the consequent degree of venous congestion were enough to cause subarachnoid haemorrhage. This has been recorded in other instances, and in fatal cases multiple haemorrhages have been observed on the surface of the brain (Symonds, 1937). The absence of increased intracranial pressure at the onset indicates that at that time there cannot have been any extensive involvement of the superior longitudinal or lateral sinuses. The later development of papilloedema and a high cerebrospinal fluid pressure were evidence of extension of clot in the dural sinuses, while the simultaneous improvement in the weakness indicated an improvement by anastomosis in the local cortical circulation.

Case V

A married woman aged 25 was admitted to Guy's Hospital under my care on June 25, 1939, on account of right-sided weakness and fits. There was no family history of epilepsy, and no personal history of illness except a miscarriage in the third month of pregnancy three years previously. About three months before admission she had become pregnant again, and on June 14 she miscarried. She remained in bed for a week under medical care. Lochia continued for about ten days in rapidly diminishing amounts. There was no record of any rise in temperature. She complained of a nasty headache towards the end of that time, but was otherwise well. On the morning of June 23 when answering the door she noticed her right knee suddenly give way. The weakness lasted for about a minute and passed off completely. She went for a walk and noticed no abnormality. In the afternoon, again while standing, her right leg momentarily gave way "as if somebody hit me in the back of the knee." This sudden momentary weakness of the right leg recurred about five or six times that day, but this did not disturb the daily routine.

During the night she woke with a numbed sensation of the whole right side of the body except the face as if it had gone to sleep. She slept again, but in the morning found the numb sensation the same, and on getting up discovered her right leg to be so weak that she could hardly stand on it. Later, while preparing the breakfast, she found she could not hold a knife, and had to get her husband to help her with the cooking. By the time she had had breakfast her right side was almost completely paralysed, and she had a bad headache. On the following day at 11 a.m. she suddenly had twitching and jumping movements in the right shoulder which lasted for a few minutes. This recurred a few minutes later. At 4 p.m. the twitching began again and spread to the right thumb and lower limb, continuing for several minutes without loss of consciousness. In the subsequent five hours there were several further attacks of this kind lasting up to fifteen minutes. In one of these she lost consciousness, and the convulsive movements spread to the left side of her body.

On admission she was mentally clear with no dysphasia. The visual fields were full. The fundi and cranial nerves revealed no abnormality. The right upper and lower limbs showed flaccid weakness. There was no defect of sensation. The arm-jerks were absent, the knee- and ankle-jerks were equal but feeble, and both plantar responses were extensor. The cerebrospinal fluid showed a pressure of 200 mm.; there were no cells, and the protein was 0.05%. The Wassermann reaction was negative in the cerebrospinal fluid and blood. The blood pressure was 100/75.

During the first few days after admission the temperature fluctuated between 99° and 100° and the pulse rate between 80 and 100. The hemiparesis remained unchanged. She complained only of headache. On June 28 on waking she complained of weakness of the *left* arm. This passed off in a few days.

Examination of the blood on June 30 showed: Hb, 70%; R.B.C., 4,400,000 per c.mm.; W.B.C., 7,000 per c.mm.; platelets normal; blood-clotting time, 2 minutes 40 seconds; bleeding time, 3 minutes. The blood sedimentation rate was observed as follows: June 6, 24; June 10, 16; July 12, 12; July 14, 14; July 17, 9; July 20, 7; July 27, 5; August 2, 4.

The patient left hospital on August 3 completely recovered and has remained well.

Comment.—Here as in Case I the lower limb was first affected, and at its worst the right hemiparesis spared face, palate and tongue, and speech. The cerebrospinal fluid, as quite often happens, contained no abnormal constituents. It was, however, under increased pressure, which suggested a primary thrombosis of the superior longitudinal sinus. The subsequent occurrence of transient weakness of the left arm supported this hypothesis.

Conclusions

It must be admitted that in all except one of the cases related in this paper visible proof of the diagnosis of thrombophlebitis was lacking. The clinical symptoms, however, exactly resemble those which have been recorded in cases (most of them following lateral sinus thrombosis from otitis media) in which the diagnosis has been proved post mortem. It appears to me probable that cerebral thrombophlebitis by direct extension from an infective

source or occurring as part of a generalized tendency to thrombophlebitis is not very uncommon and frequently runs a benign course. Such cases in the past may have been erroneously attributed to arterial thrombosis or embolism, or to encephalitis. Some, especially those in which the onset has been with focal epileptic attacks, have doubtless been diagnosed as meningitis or abscess. The latter diagnosis has occasionally led to unnecessary and probably harmful operation. I can recall two cases in which I was responsible for this error, and in Case IV above the diagnosis was so much in doubt that it needed an exploratory craniotomy to satisfy physician and surgeon that the patient would make a spontaneous recovery. For these reasons, and in the hope that they may stimulate further inquiry, it has seemed worth recording these few observations.

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THE POSSIBILITIES OF NERVE GRAFTING *

BY

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AND

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The problem of bridging a nerve gap urgently demands an answer at the present time. The problem arose in the last war, and attempts were made, by means of multiple strands of cutaneous nerves or lengths of vein and other hollow tubes, to guide the down-growing axons from the proximal end of the nerve across the gap into the distal end. The results on the whole were disappointing, and nerve grafting was discredited until the work of Duel and Ballance (1932). These workers were interested in the problem of bridging a gap in the facial nerve in the Fallopian canal, and they were able to show, in animals and in man, that this gap could be successfully bridged by means of a nerve graft taken from the external cutaneous nerve of the thigh. Their work was fully reported, and it was obvious that they obtained brilliant success in restoring movements to a paralysed face.

In 1935 we started an inquiry, in collaboration with the late Sir Charles Ballance, to determine why there should be a divergence in the results of nerve grafting. Our experiments were carried out in cats and monkeys, and the early results were reported in detail (Bentley and Hill, 1936). They led us to believe that Duel and Ballance's success in facial nerve grafting resulted from the meticulously accurate fit they secured between the graft and the two ends of the facial nerve. They were aided in this by the size of the nerve, so that they were able to obtain a graft of approximately the same dimensions, and also by the helpful circumstance that the graft could be laid in a bony groove and accurate apposition obtained without the necessity for sutures. Our experiments taught us particularly the importance of endoneural scar at the two suture lines in preventing the down-growth of regenerating nerve axons. Any inaccuracy of approximation of graft to nerve or invasion of nerve tissue by sutures caused a great increase in the amount of scar at the anastomosis, with proportionate obstruction to regenerating fibres. Particularly was this true at the distal suture line between the graft and nerve, in which the scar has some weeks to form a barrier before the fibres reach the suture line. It is probable that the disappointing clinical results of cable grafts and vein transplants reported by Platt and Bristow (1919–20, 1923–4) after the last war may be explained on the basis of scar-tissue formation. Our experiments suggest that under the conditions they describe fibrosis would be so extensive as to prevent any nerve fibres reaching the distal end of the nerve.

* Abridged from a lecture given at the British Postgraduate Medical School, University of London, July 26, 1940.

How a Nerve Graft Functions

We were interested in considering how a nerve graft functions in bridging a nerve gap, and histological studies of our nerve grafts at different periods after operation suggested to us that the graft formed a scaffolding along which the down-growing axons could grow. Duel and Ballance had had the conception of multiple neurilemmal tubes awaiting the passage of regenerating axons, and had believed that it was advantageous to allow the graft to undergo preliminary Wallerian degeneration before using it at operation, in order that the neurilemmal tubes should not be blocked by the products of axon degeneration. In a series of experiments designed to test this hypothesis we could find no difference in the rate of regeneration through fresh or degenerated grafts. The neurilemmal tubes certainly acted as a conducting medium for the new nerve fibres, but the presence of the products of degeneration seemed in no way to hinder the rate of axon growth. The importance of a nerve graft was that it provided the necessary scaffolding or framework along which nerve fibres could grow as easily and rapidly as along an ordinary piece of nerve after section and suture. It would be impossible, we believe, for anything other than nerve to provide this essential scaffolding.

It is possible, therefore, to bridge a nerve gap, given the essential scaffolding that a nerve graft provides and the minimum of endoneural scar at the suture lines. A certain amount of scar formation at the anastomosis is inevitable, but it must be kept to a minimum if a functional result is to be obtained, and we suggested that in order to obtain satisfactory results two things were essential: first, the greatest care and accuracy of technique in suturing, including only the nerve sheath in sutures of fine silk; and, secondly, employment of a graft of the same calibre as the nerve, so that accurate approximation of the cut ends of graft and nerve can be obtained.

Grafting Limb Nerves

How, then, can the problem of the limb nerves be tackled? Multiple strands of cutaneous nerve (cable grafts) do not provide the conditions essential for success, and no donor nerve of the same size as a main limb nerve is available from the patient himself. Nerve grafting in the case of limb nerves becomes impracticable unless it can be shown that a nerve taken from another individual can be used as a graft. This introduces a serious problem. Homeografts (that is, taken from another individual of the same species), in general, are reported not to survive in their new host. There is incompatibility between the cells of the graft and the tissues of the host, and such grafts excite connective-tissue reaction and are ultimately absorbed (Loeb, 1930). We thought it possible, however, that a homeonerve graft might, before it was absorbed, provide the essential temporary scaffolding along which the nerve axons could grow, and that a homeograft might prove successful providing the endoneural scar at the two suture lines was not too extensive. In our previous work (1936) we had shown in cats that a homeograft 3 cm. in length would successfully bridge a short nerve gap.

Short nerve gaps, however, are not a problem of human surgery, and in addition do not test out the utmost limitations of the homeograft. We considered it necessary to determine the fate of grafts at least three inches long in order that the results might have more direct application to the surgery of man.

We therefore carried out a series of experiments in monkeys, the results of which are being recorded in detail elsewhere. Briefly, in eight monkeys three inches of the external popliteal division of the sciatic nerve in the upper part of the thigh was removed and the gap bridged by a similar length of external popliteal nerve from the thigh of another monkey.

The extent of regeneration through the grafts was determined at different periods after operation by noting the results of electrical stimulation of the nerves and by histological study of the graft and the nerve distal to the graft, as in our previous work in 1936. We found, much as we had expected, that the graft excited a connective-tissue reaction, but that fibres were able to grow through it to the distal end of the nerve, and that about 250 days after operation motor response was obtained in the extensors of the foot. At 500 days there was a very satisfactory motor response, and histological study showed large numbers of fibres in the external popliteal nerve as low down as the ankle. Endoneural scar at the suture lines was more severe than when autogenous grafts were used, and we believe it would be advantageous to employ the technique described by Davis and Cleveland (1934) and excise the distal suture line at a time when it was estimated that nerve fibres had reached this level, and so give the nerve fibres a better chance of reaching the distal end of the nerve.

Commentary

Our experiments showed without equivocation that a three-inch gap in a main limb nerve of a monkey can be bridged with a homeograft. A nerve graft does not solve the problem of the incomplete recovery that follows nerve suture as a result of axon crossing. It probably intensifies it compared with simple nerve suture, but it is the only way to get even a partial result when a length of nerve has been lost. We believe that where a nerve gap exists in a limb nerve of man a homeograft from a fresh cadaver should be employed, since the results in monkeys are so encouraging and there is no other satisfactory method of treatment. The greatest accuracy in suturing, followed by careful recording of the result, will give us an answer to whether the homeograft can solve the problem of the limb-nerve gap in man.

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FULMINATING SEPTICAEMIA ASSOCIATED WITH PURPURA AND ADRENAL HAEMORRHAGE

(WATERHOUSE-FRIDERICHSEN SYNDROME)

BY

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Fulminating septicaemia associated with purpura and adrenal haemorrhage forms a clinico-pathological syndrome which is so striking and so characteristic that it may be considered a definite clinical entity. The earliest case reports of the condition are by Garrod and Drysdale, Still, Batten, Talbot, and others (Sacks, 1937). In 1911 Waterhouse reviewed the cases up to that time, and this was repeated by Friderichsen in 1918. In 1916 Maclagan and Cooke established an infectious origin and emphasized the significance of the meningococcus. Since then other cases have been reported, and by the beginning of 1940 these had reached a total of 70 (Carey, 1940).

Case Report

The patient, a well-nourished female child aged 10 weeks, had, apart from a slight cold for one day, been perfectly well until 6 o'clock on the evening of admission to hospital. At 6 p.m. the mother noticed that the child had suddenly become very pale. Its bowels then acted once, the motions being a little lumpy and slightly green, but containing no blood, pus, or mucus. There seemed to be no abdominal pain; there was no screaming, only slight whining. The other systems appeared normal, and no history of contact with meningitis was elicited.

Examination at 11.30 p.m. showed an extremely shocked cyanosed child—stuporous, whining, with updrawn legs—presenting almost a complete Hippocratic facies. The temperature was 98° F., the pulse rate 140, and the respiratory rate 20. The throat and ears appeared normal. There was no bulging of the fontanelle, but there was a minimal degree of neck stiffness, associated with slightly positive Kernig's and Brudzinski's signs. The heart and lungs presented no abnormality, but a moderate degree of abdominal rigidity was observed. There were a few purpuric haemorrhages on the trunk.

Diagnosis was therefore made of acute fulminating meningococcal meningitis, and appropriate treatment was administered. The child's general condition, however, rapidly declined, extensive generalized and diffuse purpuric haemorrhages appeared, and death occurred four hours after admission.

Necropsy revealed the brain to be of soft consistence, with an increased amount of cerebrospinal fluid and a moderate degree of meningeal congestion. There was no exudate, either on the surface of the brain or in the ventricles. The tonsils were not enlarged. Heart, lungs, and gastro-intestinal tract presented no abnormality except for hyperplasia of the lymphoid nodules of the intestine. The liver was enlarged, pale, and flabby; the spleen was also enlarged, and the kidneys were somewhat pale. The pelvic viscera appeared normal. Both suprarenal glands were dark red in colour, and the cortex and medulla were haemorrhagic.

Microscopically both suprarenals were intensely congested, and were diffusely and completely infiltrated with blood. Only cells of the cortical glomerular zone remained. The thyroid was congested, but to a lesser degree, and presented a few haemorrhages. The pituitary was slightly congested, and had some small haemorrhagic areas. The lungs also were slightly congested, and the spleen appeared normal. A smear of the splenic pulp revealed Gram-negative diplococci, morphologically compatible with the meningococcus.

Clinical Features

The clinical picture is so characteristic that if the condition be borne in mind diagnosis during life should be possible. 70% of the cases occur in infants under the age

of 2 years, and 90% during childhood or adolescence. The sex incidence is equal. The picture presented is a combination of acute adrenal insufficiency and the phenomena of a fulminating infection—for example, purpura, pyrexia, etc. Characteristically, a previously healthy child with perhaps brief respiratory catarrhal infection becomes suddenly collapsed, with Hippocratic facies. Vomiting and hyperpyrexia may occur. Purpuric haemorrhages are present at the onset, and rapidly become extensive, even to the simulation of post-mortem lividity. Meningitic signs are usually absent. Diagnosis must be made on the clinical features of the case, as the cerebrospinal fluid is usually normal and little time is available for study of blood electrolytes. Death occurs usually within twenty-four hours of the onset.

Treatment

These patients die from a combination of the results of fulminating infection and acute adrenal insufficiency. The former must be combated with chemotherapy (the infection in 60% of cases being due to the meningococcus and less often to the haemolytic streptococcus). The acute adrenal insufficiency is treated with large doses of sodium chloride (enterally or parenterally) and adrenal cortical hormone—the extract or desoxycorticosterone. That treatment is practicable and possible was demonstrated in the case of Carey's (1940), in which recovery was effected in a patient with this syndrome.

Summary

A case of fulminating septicaemia, purpura, and adrenal haemorrhage (Waterhouse-Friderichsen syndrome) is reported. The salient features of the clinical picture are described, and rational and effective therapy is outlined.

My thanks are due to Dr. W. Allen Daley, medical officer of health, L.C.C., for permission to publish this case.

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ELEVEN YEARS OF DIPHTHERIA IMMUNIZATION IN A RURAL DISTRICT

BY

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Many years have elapsed since Copeman (1921) suggested the desirability of investigating the advantages which might result from large-scale immunization of children against diphtheria, and it is felt that the following report of eleven years' experience of mass immunization as carried out in a scattered rural district may be useful, both on account of the results achieved and also as indicating some of the practical difficulties to be overcome.

Several reports have already appeared indicating that where systematic mass inoculation has been adopted in large towns there has been a subsequent fall in the incidence of the disease. The practice was instituted on a small scale in Birmingham in 1926, when over 400 school children were treated. The numbers have been increased in the years following, and Burn and Fellowes (1934) report that between 1901 and 1931 the case rate per 1,000 of population varied between 0.86 and 2.00, while in 1932 and 1933, after six years' systematic inoculation, it was 0.60 and 0.41 respectively. A similar fall in incidence has been reported in Montreal, where immunization was begun in 1928. Graham Forbes (1932) gives the incidence in 107 great towns of over 50,000 population each, in which the total protected at the end of 1930 was more than double the number protected at the end of 1928. There was a drop in 1931 of 30 per cent. in the number of notified cases.

Attention has been drawn by Seckel (1939) to the danger of attempting to assess the efficacy of immunization from data obtained over a short period of years, on account of the normal swing from trough to peak in the incidence of the disease. In New York City, for example, a cycle of six to seven years has been apparent since 1895. It is clear that, to be significant, any fall in incidence must be maintained over a period when a rise would be expected, and that the new level should remain at approximately that of the years which were previously "low level" ones.

Fall in Incidence following Inoculations

We have traced the annual incidence in this rural district and borough since 1912 and find that there were peaks in the years 1913, 1921, and 1929. These were sharp and definite, the notifications at the lowest peak being twice that of the highest number in the intervening years, and at the highest fifteen times as great. Although our numbers are small compared with those of the great towns, the cyclical occurrence of peak years appears to be regular, and from the data of the previous years the next peak was to be expected in 1937. Neither in that year nor in the two subsequent years did any increase occur.

Inoculations were begun during the 1929 epidemic and have been continued ever since, a few schools being treated each year. By the end of 1939 approximately 4,000 children under 15 had been inoculated. The population of the rural district and borough together has remained almost constant at about 24,000 during the period under consideration. For England and Wales 36.7 per cent. of the population are under 15 years (Registrar-General's Statistical Review, 1938). If we accept this figure as approximately correct for this district we find that some 45 per cent. of the child population have been protected. The Ministry of Health (1940) considers that if 75 per cent. of all children under 15 were immune the disease would be abolished. We feel justified, therefore, in concluding that the absence of a peak in 1937 is due to the protective measures taken and has not been merely a fortuitous occurrence. The annual notifications and numbers immunized per 1,000 of population are shown graphically in the chart.

Discussion has taken place recently concerning the advisability or otherwise of utilizing the Schick test and also on the best methods of securing the consent of parents and the co-operation of school authorities. In this connexion an account of our experiences may be of interest.

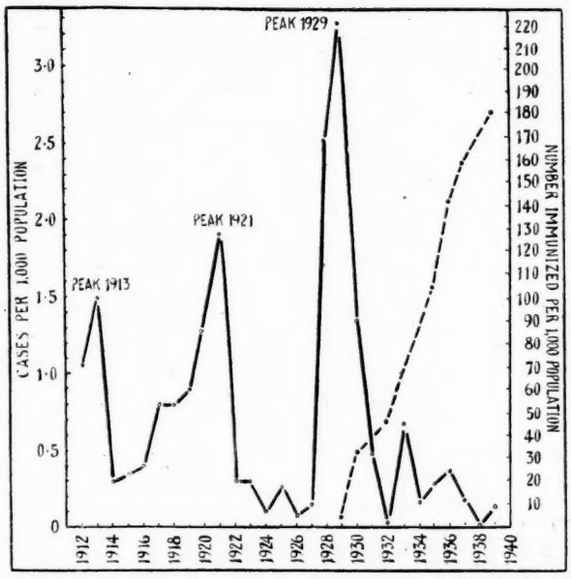
The Procedure in Cullompton

In the 1929 outbreak the town of Cullompton and the surrounding district were intensively involved and the public were naturally greatly alarmed. A public meeting was therefore held in the town to explain the value of inoculation, and it was well attended. Dr. W. A. Lethem of the Ministry of Health addressed the meeting and a film entitled "New Ways for Old" illustrated the value of inoculation. Response by parents was rather poor at first, only 35 per cent. of the total consenting to have their children protected. The material first used was T.A.M. supplied by Messrs. Burroughs Wellcome. Three injections were given at fortnightly intervals. Reactions were negligible, but there was a disposition among some of the children to avoid their third dose, although they were mostly quite good about the first two.

Procedure was made as informal as possible: the classrooms of the school were used, and one of the mistresses acted as second nurse, the first usually being a volunteer from the staff of the local general hospital. One of the local general practitioners, together with the medical officer of health, administered the injections. It was found that the inclusion

of a local doctor had a beneficial effect on the proportion of consents and also a reassuring effect on the children.

Before inoculation hypodermic needles were carefully examined and the points attended to, with the result that children often did not realize they had received the injection until it was over. Injections were given into the deltoid, as high as possible, after first cleansing with spirit and dabbing with tinct. iodi mit. Reactions were negligible, and it was seen that in the space of ten to twelve weeks the incidence of diphtheria in the locality definitely decreased, although it had previously continued unabated for twelve months. It was decided that there would be no advantage in employing the Schick test, as it was very desirable at the time to establish a mass immunity as soon as possible, and a preliminary Schick test would have entailed a certain loss of time. In addition to this we felt that both children and parents desired that injections should be as few as possible. Children appeared to treat the first two injections as rather an adventure, but later they developed some resentment. One felt, therefore, that Schick-testing would add to their troubles unnecessarily and thus imperil the popularity of the whole procedure. It is to be noted that the Schick test was abandoned in Birmingham in 1930 for very similar reasons.



The continuous line shows the annual notifications of diphtheria since 1912, with an eight-yearly peak. The dotted line shows the cumulative numbers protected by immunization from 1929 to 1939. It will be noted that the peak expected in 1937 did not occur.

Procedure in Surrounding Villages

In other villages a similar procedure was adopted. The schoolmaster would send a note to each parent (usually copied from the blackboard by the children themselves) stating that the M.O.H. would address them on inoculation against diphtheria immediately after school hours on such and such a day. In spite of the fact that in many cases long distances had to be traversed these lectures were invariably well attended. Parents were encouraged to ask questions and an informal atmosphere was maintained. Response depended a great deal on the support of the local schoolmasters and mistresses, who were usually enthusiastic and very ready to help. Perhaps our greatest difficulty lay in finding time to get round our very widespread district in order to deal with the numerous small schools each containing about forty to fifty children. When one considers that the population of the district (rural) is only 24,000 and the area is over 85,000 acres, its lateral extent being twenty miles, one can form some idea of the difficulties. Parents were invited to bring their children under school age to be treated at the same time as those of school age. It was found a good plan to institute inoculation in a village immediately after a case of diphtheria had occurred, interest being then active. It was realized that there are certain objections to this course, but we felt that the advantage gained by the public anxiety led to a larger number of consents. It was found that there were some villages in the area in which diphtheria had never been known to occur, and these were of course not dealt with at an early stage. As inoculation proceeded opposition diminished, and when the town of Cullompton was treated a second time—three years later—the percentage of consents rose to 65. Later still, in 1939, when the same town was dealt with a third time, it was only necessary to treat the junior school, and consents had risen to 90 per cent.

In 1934 alum-precipitated toxoid was being recommended by several authorities, administration then being by the "one-shot method" of 1 c.cm. This was used for a short time, but we finally adopted the method of administering 0.25 c.cm. and 0.5 c.cm. of A.P.T. at an interval of not less than one month between doses, which, we found, gave rise to no troublesome reactions. While carrying out these injections we were interested to note that at least 50 per cent. of the children showed no wheal from vaccination against small-pox, and we drew the conclusion that many parents who must have objected to vaccination against small-pox did not carry their objections to inoculation against diphtheria.

The village of Silverton offers another example of the growth in popularity of the procedure. In 1930 the response here reached a bare 30 per cent., whereas in 1939, when the village was again dealt with, it was 85 per cent. One now often receives voluntary requests from village school authorities to have their school inoculated.

Random Observations

Three instances occurred in the district in which the only uninoculated child in a household contracted diphtheria, whereas the remaining children escaped. Four children in the village of Langford contracted severe faucial diphtheria about one month after inoculation, but no case of clinical diphtheria has occurred in the district in any child who had been inoculated for three months or more. Several examples could be quoted of outbreaks of diphtheria being terminated in various villages by means of inoculation, two of the most striking being the outbreaks at Oakford and Huntsham. Another phenomenon noted was that since inoculation one now sees an occasional sporadic case of diphtheria occurring in a village, sometimes in a visitor, with no cases following, whereas prior to inoculation cases usually occurred in groups. With regard to compulsion, we feel that it has yet to be shown that this is really necessary. The system of giving lectures to the parents should be worthy of a more extended trial, and should prove more efficacious than the mere issue of pamphlets, which are not always read.

In 1934, it may be remembered, the incidence of diphtheria in the country was high (68,634 cases, as against 47,388 in the previous year). This had the very desirable effect of inducing Tiverton borough to adopt inoculation. Conditions here were much easier to deal with, as the children were congregated in six schools only. In the elementary schools 800 children were dealt with in the first instance, and in addition Blundell's public school and all private and secondary schools in the borough were inoculated by their own medical officers. Since that date it has been our practice to carry out a follow-up campaign in the borough at intervals of two years, when it is necessary to deal only with the junior schools. Usually about 150 children are inoculated on each occasion.

With regard to cost, we find this averages 3s. 3d. per head, while the average cost of the treatment of a case of diphtheria in hospital is about £15.

Our thanks are due to H. New, former chairman of Tiverton R.D.C., and to F. Voysey, the present chairman, for giving the scheme their support in its early stages.

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Clinical Memoranda

Eleven Years of Diphtheria Immunization with a Toxoid-Antitoxin Mixture

The Hackney Diphtheria Immunization Clinic was opened in 1928, and a toxoid-antitoxin mixture (Burroughs Wellcome) has been used there ever since. The technique employed and the results obtained are given here.

During the first four years my predecessor employed the usual practice of giving three doses of 1 c.cm. of T.A.M., the first two at weekly intervals and the third a fortnight after the second. All children under 12 were given full doses: those over 12 were first desensitized by a dose of 0.25 c.cm. Twelve weeks after the last injection all children were Schick-tested, but as 6.1% were positive it was decided to extend the waiting period to sixteen weeks, when the percentage dropped to 1.5.

As local and general reactions were occasionally reported in older children, I modified the technique during the last two or three years. All children under 7 now receive the full doses as stated above. Those between the ages of 7 and 10 receive 0.75 c.cm. as their first injection, 1.25 c.cm. as their second injection, followed by the usual 1.5 c.cm. a fortnight later. All children over 10 are first given a desensitizing dose of 0.25 c.cm. If this gives no reaction whatever, 0.75 c.cm., 1.25 c.cm., and 1.5 c.cm. are injected at the usual intervals, but even if there is a slight reaction after the desensitizing dose smaller doses and gradual immunization are indicated. Since I have started this new technique no local or general reactions have been reported to me.

During the eleven years 7,695 children have been immunized, and sixteen weeks after the last injection only 177 (2.3%) were found to be still Schick-positive. Among the 7,695 children immunized only eleven cases of diphtheria have been contracted, and on investigation all these proved to be mild, with no deaths. I believe that these figures prove the great efficacy of the toxoid-antitoxin mixture, and that they compare very favourably with those obtained by other reagents.

H. W. SWANN, M.B., B.S.,
Medical Officer in charge of the Hackney Diphtheria Immunization Clinic.

Intestinal Strangulation simulating Perforation of a Peptic Ulcer

Strangulation of the intestine is often accompanied by the transudation of a considerable amount of blood-stained fluid into the peritoneal cavity, but this rarely causes enough peritoneal irritation to produce generalized abdominal rigidity. It therefore seems worth while to report a case in which the rigidity was so pronounced that an erroneous pre-operative diagnosis of perforation of a peptic ulcer was made.

CASE REPORT

A man aged 59 was admitted with a complaint of violent abdominal pain, sharp and stabbing in character, which had begun suddenly twenty hours previously. There had been persistent vomiting after the onset of the pain, but neither flatus nor faeces had been passed since. Shortly before admission he had felt pain in the right shoulder. There was no previous history of dyspepsia.

On examination an extremely ill patient was seen. The temperature was 99° F. and the pulse 110. The tongue was dry, the respirations were shallow and grunting, and the patient was obviously reluctant to move in bed. Abdominal respiration was absent, and generalized rigidity and tenderness were present. There was no loss of liver dullness, but flank dullness was apparent. The complaint of right shoulder-tip pain was confirmed.

At operation the explanation of these findings was quickly found. As soon as the peritoneum was opened a large amount of blood-stained fluid escaped. Aspiration showed that this amounted to about 750 c.cm. A large mass of strangulated small intestine was found in the right iliac fossa. The mass had prolapsed through a hiatus formed by a band passing from the root of the mesentery to the medial side of the caecum. After division of the band it was apparent that the gut was not viable, since a foul odour was present and large areas of the serosa had lost their normal glistening appearance. Resection and end-to-end anastomosis was therefore performed and the abdomen closed with pelvic drainage. The specimen was found to consist of some seven feet of lower ileum with a Meckel's diverticulum near the distal end. The whole gut was black in colour and contained much dark blood.

At the end of the operation the patient's condition was critical, the blood pressure being 76/60 mm. Hg and the pulse 140. Through the good offices of Dr. John McMichael the patient received 1,080 c.cm. of citrated plasma intravenously, and the blood pressure rose rapidly to 120/90. The following morning the blood pressure was 160/98 and the pulse 96.

The post-operative course was complicated by persistent abdominal distension, which was successfully treated by continuous gastric suction, replacement of fluids and electrolytes intravenously, 100% oxygen administered by the B.L.B. mask, and prostigmin intramuscularly. The patient was discharged on the twenty-fourth day.

Acknowledgment is made to Dr. John McMichael for the data on the plasma transfusion, to Mr. Paul Stringer, house-surgeon at Hammersmith Hospital, for his unremitting care in carrying out the post-operative treatment, and to Dr. Allen Daley, principal medical officer to the L.C.C., for permission to publish the case.

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First Assistant in Surgery,
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The Crawling Baby

Who doesn't know the old Greek riddle of Oedipus: "What animal is it that walks first on four legs, then on two, and finally on three?" The answer is: "The man." Because when a baby he crawls on four legs, later he walks on two feet, and when an old man he leans on a cane and so walks on three legs.

When does the human child crawl on all fours? He starts to crawl at about the age of eight months and begins to walk at the end of the first or the beginning of the second year of his life. After he is able to walk he crawls only for pleasure. However, have you never seen a young baby crawling during the first months of his life? Well, perhaps you have. But he never crawls intentionally. During this early lifetime he crawls by a reflex. When you put a newborn child on a smooth table on his tummy and touch his soles with an object or with the palms of your hands he starts crawling on all fours, provided you continue touching the soles, giving a resistance for pushing off. He really crawls supported by his arms and hands and making winding movements with his vertebral column like a lizard. This crawling is caused by a reflex. Being touched compels the baby to crawl, even though he may not like it. This reflex is always effective. It is only checked by one other reflex, superior to it—namely, the sucking reflex. If the child gets an object between his lips or in the vicinity of his mouth he doesn't crawl. When, for instance, the baby gets a piece of the tablecloth into his mouth he stops crawling.

You will find this crawling reflex in a baby from the moment of his birth till the fifth month of his first year. During the fifth month the reflex disappears. If it does not disappear at this age the baby is feeble-minded, and so the physician can use the reflex for the diagnosis of idiocy at the age of six months, whereas the ascertainment of this diagnosis is otherwise very difficult. Between the sixth and eighth months a normal baby crawls neither voluntarily nor under the influence of this reflex, which is now absent.

What is the meaning of this complicated reflex? It is important for the development of the human being because certain mammals crawl by means of it to the udder of their mother. In such a manner it is a further proof of the fundamental rule of biology—that ontogeny, the development of human beings, runs parallel to phylogeny, the evolution of

the species. It is evident that this reflex is stopped in the fifth month of the first year of life by the growing of the great brain. Therefore it is lasting in the case of idiocy, when the cerebrum is not developing properly.

Even prematurely born children crawl when this reflex is invoked, and so we may reasonably assume that some intrauterine movements are caused in a like manner.

JULIUS BAUER.

Perforated Typhoid Ulcer

In older children and young adults it seems that, no matter how desperately ill the patient may be and no matter how late he may be brought to the surgeon after perforation, operation should be performed, as it holds out a chance of success. The following is a case in point.

CASE REPORT

A native girl aged 10 was admitted to the Mayo Hospital, Nagpur, at 5 p.m. on October 23, 1939, and was seen by me soon after. It was difficult to obtain any accurate history, but it appeared that she had been ill with continuous fever for about a fortnight at home, and that thirty-six hours before admission she began to complain of violent colicky pains in the abdomen; since that time her bowels had not moved.

Examination revealed a dehydrated and badly nourished child whose hair and body had not received any cleansing for many days. Her temperature was 101.6° F., pulse 126, and respirations 32. She was moaning, and had great difficulty in breathing; her abdomen was very tender and absolutely rigid, and on auscultation no peristalsis could be heard anywhere. No more accurate diagnosis than general peritonitis was possible, but a perforated typhoid ulcer was suspected as the cause. I immediately performed laparotomy under 1 c.cm. of stovaine spinal anaesthetic. On opening the abdominal cavity flaky and slightly opaque fluid was evacuated. The distal three feet or so of ileum was deeply congested, and about a foot from the ileo-caecal junction, on the antemesenteric border, could be seen a circular perforation about one-sixteenth of an inch in diameter. About three inches below this, similarly placed, was another small black spot which was obviously going to perforate. Both these spots were inverted by means of purse-string sutures of the finest catgut, and as no other danger spots were found a suprapubic drain was inserted and the abdomen closed. During the operation intravenous glucose in water was given, and after return to the ward rectal glucose was administered continuously by Murphy's drip method for two days. By the twelfth day after operation the temperature had reached normal, and the wound, which had broken down after operating, was practically healed. From the seventeenth to the thirtieth day there was a relapse of the fever. The patient was discharged from hospital on December 10 cured.

On November 10 the Widal test was:

	1/25	1/50	1/125	1/250
B. typhosus	+	+	+	−
B. paratyphosus A ..	−	−	−	−
B. paratyphosus B ..	+	+	−	−

I did treat a case which I considered to have perforated, in which operation was refused, and which recovered; but I think such a result is not to be anticipated, and operation gives a better chance of recovery.

F. R. W. K. ALLEN, D.M., M.A.O.
Central Jail, Jubbulpore, C.P.

Full-time members of the Civil Nursing Reserve who are already employed in hospitals or on casualty trains may now apply for a guarantee of twelve months' continuous employment provided they satisfy certain conditions, and in particular undertake to serve full time in any emergency hospital in Great Britain to which they may be sent. Inquiries concerning the scheme should be addressed to the authority of the hospital by members already employed, and to the county medical officer or county borough medical officer of health in all other cases (in Scotland to the medical officer of health with whom the member is registered).

Reviews

CLINICAL BIOCHEMISTRY

Biochemistry of Disease. By Meyer Bodansky, Ph.D., M.D., and Oscar Bodansky, Ph.D., M.D. The Macmillan Medical Monographs. (Pp. 684. 30s. net.) New York: The Macmillan Company. 1940.

The *Biochemistry of Disease*, which is the title of a new book by Drs. M. and O. Bodansky, is a very topical subject. The advances in medicine in recent years have been for the most part biochemical in nature, and many of the problems which the war has thrown up, such as gas-poisoning, shock, and chemotherapy, need biochemistry for their solution. The subject of biochemistry in disease, or clinical biochemistry, is something quite different from biochemistry, which is a fundamental science, and medical biochemistry, which is an educational discipline. In clinical biochemistry we wish sooner or later to know how the organism reacts as a whole. What happens to the body chemistry when there is haemorrhage from a gastric ulcer or when the intestine is obstructed? And how are the findings related to the water-cramps of workers in hot atmospheres or the precautions to be taken when administering mercurial diuretics? When a house-physician inquired the other day for a book which would give him an insight into the type of biochemical investigation and research which is carried out in an efficient professional unit it was not easy to answer. Harrison's *Chemical Methods in Clinical Practice* is invaluable for the ordinary facts, and on a grander scale Peters and Van Slyke's *Quantitative Clinical Chemistry* is superb for methods and interpretations. Nevertheless what the beginner wants is a framework to which to attach his data, and he will get this best from a series of essays or short reviews corresponding with some of the Goulstonian Lectures, medicine monographs, and physiological reviews which have appeared during the last twenty years. It seems to us that the approach must be physiological, and that it must cut across the ordinary divisions of clinical medicine. We must therefore confess frankly to a feeling of considerable disappointment with the Bodansky's book, which is really yet another textbook of medicine with rather more biochemical detail than usual. Some of the sections, such as those on purpura and agranulocytosis, have no apparent relation to biochemistry; at the same time the description of mineral metabolism and porphyrins is inadequate for a book this size. The chapter on diseases of the pancreas has the subheadings: "Diabetes mellitus; Acute non-haemorrhagic pancreatitis; Acute pancreatic necrosis; Chronic pancreatitis, including cystic fibrosis of the pancreas; Pancreatic lithiasis; Tumours of the pancreas, hyperinsulinism and spontaneous hypoglycaemia." To get a clear picture of serum phosphatase the student would have to look up about seven different sections.

Now it may be admitted that books on dietetics and on treatment likewise follow the conventional lines of clinical medicine, but we cannot agree with the authors that "the arrangement of the biochemical material in accordance with the clinical entities would make it pertinent, available, and utilizable." Clinical entities can never be the same as biochemical entities, and to identify them is to prevent the integration of knowledge which is the professed aim of the book. While, therefore, we may commend the authors for their industry, their up-to-dateness, and the completeness of their bibliographies, we cannot praise the book sincerely.

SURGERY OF THE HAND

Surgery of the Hand. By R. M. Handfield-Jones, *M.C.*, M.S., F.R.C.S. (Pp. 140; 95 illustrations, including several in colour. 15s. net, postage 6d. extra.) Edinburgh E. and S. Livingstone. 1940.

In a London daily newspaper the other day an announcement appeared that "agreed damages of £1,400 were awarded in the King's Bench Division to a claimant for the loss of her right hand while working in a factory." Such a statement reminds us forcibly of the legal assessment of the great value of the hand to a worker, if indeed any reminder were needed. We are all *manual* workers in some degree, and so it is proper that our profession should devote increasing attention to the treatment of injuries and infections of the hand. In the heavy industries, which are so important just now, over 60% of all accidents involve the hand.

Since Kanavel's classic was first published several monographs on the hand of considerable merit have been produced. The latest is written by Mr. Handfield Jones, and represents the teaching and practice in the "Hand and Finger Clinic" at St. Mary's Hospital. The book gives a very clear and concise account of the whole subject, including infections, injuries, and other surgical lesions. For the most part the author follows orthodox teaching, although he has certain changes to suggest as a result of his experience. For drainage of the mid-palmar space, for instance, a transverse palmar incision is advocated in place of Kanavel's vertical ones because "the scar is painless and does not interfere with recovery of full function"; we believe, however, that full function is usual after the original incisions, while they have certain features of safety for the novice. Henry's recent suggestions for approaching the ulnar bursa and the palmar space from the lateral aspect are described and illustrated. The peculiar progressive necrosis associated with injuries from indelible pencils, upon which Continental and American writers lay stress, receives attention, as does also the painful "glomus" tumour; indeed there are few lesions of the hand which are not dealt with.

The illustrations are excellent and form a special feature of the book, many of the anatomical diagrams being in colour. The publishers deserve much praise for producing a very pleasing monograph in first-class style from cover to cover.

SCIENCE, RELIGION, AND ETHICS

Religion in Science and Civilization. By Sir Richard Gregory, Bt., F.R.S. (Pp. 366. 12s. 6d. net.) London: Macmillan and Co., Ltd. 1940.

Sir Richard Gregory tells us that the genesis of this book was two lectures delivered in America, one on "Cultural Contrasts of Science," the other entitled "Religion in Science," and that he found his theme extending into wider fields than those originally contemplated. We suspect that this explains his extraordinarily discursive presentation of the subject. Much more material had been collected than was needed for the lectures, and it was heart-breaking to see it wasted; so, without recension, into the book it went; hence unnecessary repetitions. It is a great pity, for there is so much of interest in these pages which would have been enhanced in value had the author planned his work in a clear-cut scheme. The absence of this plan from a book dealing with scientific method is particularly unfortunate. Moreover, the title hardly conveys the scope of the book, which is largely concerned with the application of the scientific method to the study of comparative religions. As might be expected from Sir Richard Gregory, the astronomical aspects receive special attention, and the saying in the book of Job, "Canst thou bind the sweet influences of Pleiades?" acquires new meaning at his hands. It is also interesting to learn that Francis Bacon would never accept the Copernican theory of the universe, while telling others how science could be advanced. It affords some justification for William Harvey's slighting remark about his great contemporary. Another comment of interest is that as the geocentric view was the orthodox one at the time Milton wrote *Paradise Lost*, it was to relieve his own mind that he attributed to the angel Raphael the suggestion that the Copernican view might be the true one.

The author adopts Freud's view that Mosaic monotheism originated with Akhnaton, from which it is indeed probable that Jewish theology derived much. The very language of the Psalms is repeatedly reminiscent of Akhnaton's "Hymn to the Sun." But while freely admitting all this, we do feel it is a mistake to regard, as the author does, Freud's highly speculative ideas about Moses I and II as if they commanded any real support.

At this particular juncture it is probable that many readers will be most interested in Sir Richard Gregory's discussion on science and social ethics. Many leading scientists have come to feel that the laboratory worker can no longer carry on his researches on an entirely abstract plane without considering the social implications of his results. Samuel Butler's *Erewhon* was a disregarded Sibylline book, and treated as airy persiflage, when it was in fact a solemn warning of the dangers of mechanization without corresponding moral advance. To-day we see that warning fulfilled, and to quote Sir Richard, "Though the standard of human values has been raised, man has advanced so little in his regard for them that he is just as much a barbarian in his use of aerial bombs and poison gas as he was when his weapons were only clubs and arrows."

Sir Richard Gregory's interests are wide and varied, but he is perhaps best known as Editor of *Nature* for forty-five years; yet the chief defect of this book is lack of editing. Still, it is alleged that the wills drawn up by judges of the High Court are often invalid.

STATISTICAL METHODS FOR MEDICAL AND BIOLOGICAL STUDENTS

Statistical Methods for Medical and Biological Students. By Gunnar Dahlberg, M.D., LL.D. (Pp. 232. 10s. 6d. net.) London: George Allen and Unwin, Ltd.

Professor Gunnar Dahlberg's object has been "to present statistical methods in a form calling for no special knowledge of mathematics," while giving an idea of the concepts upon which the methods were based. He has covered the ground usually travelled over by the writer of an elementary book (more space is devoted to measures of asymmetry and dissymmetry than the scale of the book warrants), and illustrated the methods on data of more or less direct importance to a medical reader; the two chapters on personal variability and defects of materials make points which are of importance and often overlooked. How far he has succeeded in his undertaking must be a matter of opinion. A mathematical book presents two difficulties to a general reader. In the first place, he may have an innate dislike to or aversion from mathematical notation, an inability to grapple with the mere language; in the next place, while not repelled by the language, he may fail to understand the words. Perhaps a rough analogy may illustrate the difficulties. To some children (and adults) to learn the elements of such a language as Latin, the structure of which is utterly different from that of one's mother tongue, is a repellent, even impossible, task. But many can master these elements and are able to make out the meaning of a simple piece of Latin prose. These, however, would be utterly defeated by a "difficult" epigrammatic writer—a

Tacitus or a Martial. These remarks apply to the study of mathematics or mathematical statistics. Professor Dahlberg has certainly provided against the second class of difficulties; it is easy mathematical prose, but still mathematical. Such a page as p. 116 or p. 138 will be repellent to those who hate symbols. Certainly, anyone who works through the book will learn a good deal, but the same can be said of many other manuals.

AN OBSTETRICAL SYNOPSIS

Synopsis of Obstetrics. By Jennings C. Litzenberg, M.D., F.A.C.S., Professor Emeritus of Obstetrics and Gynaecology, University of Minnesota Medical School, Minneapolis. (Pp. 394; 157 figs. 21s. net.) London: Henry Kimpton. 1940.

A medical synopsis and a fast sports car have a similar fascination for many young students. They both enable a great deal of ground to be covered in a relatively short time, but it should be remembered that there are dangers peculiar to the rate of travel. These dangers can be lessened by wise instruction on how they may be avoided, but no such advice in the use of his synopsis is given by Professor Litzenberg.

The book is arranged on orthodox lines and gives a very comprehensive survey of obstetrics. It opens with a brief account of the anatomy and physiology of the internal reproductive organs, but in places the statements are scarcely scientific, as, for example, "The fundus uteri is the very top of the uterus." Succeeding chapters deal with menstruation, ovulation, placentation, and the foetus, after which ten chapters are devoted to pregnancy, labour, and the puerperium. The pathology of pregnancy is well summarized in a series of chapters which classify on a systemic basis the conditions that can occur. The section dealing with toxaemia of pregnancy is particularly good, and gives an excellent summary of the various clinical manifestations of toxaemia and of the modern views on treatment. Gynaecological complications of pregnancy and labour are summarized, and clear instructions are given of the safest methods of dealing with them. The concluding chapter is devoted to obstetric surgery.

With few exceptions the teaching throughout the book is orthodox and conservative according to widely accepted standards in Great Britain, and excellent diagrams and illustrations are lavishly provided. Readers who find synopses useful would be well advised to inspect this book carefully with a view to adding it to their library.

Notes on Books

Essentials of Physiological Chemistry, by ARTHUR K. ANDERSON, Ph.D., now in its second edition (Chapman and Hall, 13s. 6d.), is designed for students of domestic economy and human nutrition, though it might with some few modifications serve equally well for the medical student. It is primarily for those who like the plain facts in full, for with the exception of the earlier chapters on the chemistry of biological compounds, which are excellently written, the author has concentrated rather on his material than on his style. The dogmatic form has obvious advantages in assisting the beginner to grasp essentials. The new edition includes an entirely new chapter on "The Composition of Tissues," while under most of the original headings, by addition of new material and considerable rewriting, the work has been brought fully up to date.

Volume X of the *Collected Papers of the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne*, for the year 1938–9, containing reprints of forty-two papers, has been received from the Director, Dr. C. H. Kellaway, and may be consulted in the Library of the British Medical Association.

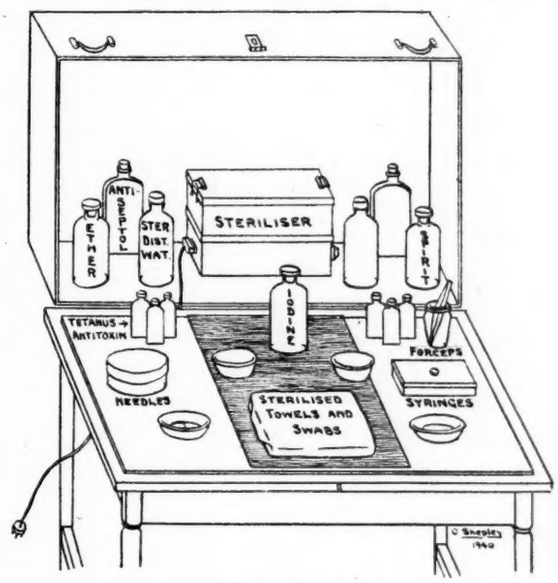
Preparations and Appliances

CABINET FOR ANTI-TETANIC INJECTIONS

Professor A. MURRAY DRENNAN (Edinburgh) writes:

In an A.R.P. reception post where everything must be ready for casualties at short notice, but where there may be long periods when none appears, it is often difficult to arrange that apparatus, etc., should be rapidly available and yet kept in good condition and free from interference. To meet these difficulties with regard to the anti-tetanic outfit the cabinet illustrated has been designed by Mr. Frank Pettigrew, laboratory supervisor of the surgical department of Edinburgh University, and approved by Professor Learmonth of that department and by Professor Brash, in charge of the A.R.P. casualty reception post for the Edinburgh Royal Infirmary, where the outfit is at present in use.

The whole arrangement is very simple and can be adapted to any suitable table. The actual dimensions of the table illustrated are four feet long by two feet wide. A cover is



made of light ply-wood and hinged at the back. In front are two handles and a hasp, so that the lid may be padlocked. The inside of the lid is painted white and on the table top is a slab of white glass one-quarter of an inch thick. When not in use the bottles, sterilizer, etc., are placed on this slab and the lid closed and locked. When the outfit is required the lid is unlocked and opened back against an adjacent wall, which supports it; if desired folding brackets might be fitted at the back to support the opened lid should a wall not be available. The electric sterilizer, bottles of distilled water, ether, spirit, and antiseptol are placed on the shelf formed by the back of the opened lid, while on the slab are arranged conveniently the tetanus antitoxin bottles, iodine, needles, syringe, basins, and the packet of sterilized towels and swabs. It is of course desirable before use to wipe over the surface of the glass slab with spirit. The sealed package containing the sterilized towels and swabs is opened just before use and a sterile towel (shown as shaded area in the diagram) is placed on the slab. Incidentally, it should be mentioned that the wrapping of this packet is "kraft" paper, which can be autoclaved with the contents, ensuring sterility for a considerable time.

Obviously various modifications may be made in such an outfit to suit individual requirements, but, as shown, this cabinet contains all that is required for two teams to get into operation in a few minutes, and it is always available.

SULPHANILAMIDE EYE OINTMENT

Streptocide ointment (ophthalmic) is a preparation issued by Messrs. Evans Sons Lescher and Webb. The ointment contains sulphanilamide, and is recommended for use in conjunctivitis and other inflamed conditions of the eyes.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY SEPTEMBER 14 1940

CONGENITAL MALFORMATIONS

While we may justly claim for England the invention of biometry as a serious method of scientific research, and can say that the output of English biometricians since the time of Francis Galton has been creditable, this is now far exceeded by the publications of American inquirers. A great part of the explanation is, no doubt, the larger population of the United States and the greater volume of research grants for private statistical investigations. It is also possible that Americans take more kindly to work which, while very laborious and not often leading to wholly novel and striking conclusions, will usually justify the making of a report.

Dr. Douglas Murphy, assistant professor of obstetrics in the University of Pennsylvania, has produced a careful statistical analysis of data throwing light upon the aetiology of congenital malformations.[1] The starting-point was the death of a malformed child registered in Philadelphia in the five years 1929–33. Inquiry was made in each case and the data reduced to a total of 890 well-authenticated diagnoses affecting 884 different families. Upon these families the research is based, and where possible statistical controls from families in which malformations had not occurred were applied. The findings are set out under more than thirty headings. The first question one is tempted to ask is whether such malformations—namely, those incompatible with normal survival (less than 3% survived seven years)—run in families. The answer is that in families already possessing a malformed child the birth of a subsequent malformed child occurs with a frequency about twenty-four times that of the general population. Although the difference is too great to leave much room for doubt, it is perhaps methodologically unsound to compare the total proportion of defectives among live-born children with the proportion of defectives among later-born children in families with earlier-born defectives, because the age distribution of the mothers in the latter families will be different and the data show that children of older mothers or children born late in family are more likely to be defective. But accepting a tendency to run in families, can this be attributed to genetic factors? The hereditary transmission of certain defects is, of course, well known, but a research on the present lines could not be expected to throw direct light on the matter. It does, however, suggest that neither economic nor social status is a factor, that the mothers were not especially unhealthy, and that the normally developed siblings experienced no unusual morbidity or mortality.

Dr. Murphy's general conclusion is as follows: "The observations which have been made during the course of the present investigation lead to the general conclusion that gross, human, congenital malformations arise solely from influences which affect the germ cells prior to fertilization. No evidence is available to indicate that they result from factors which operate for the first time after fertilization has taken place." The last sentence is literally correct. It is shown that a considerable proportion of the mothers took an unbalanced diet during pregnancy, but this was one of the characters studied which could not be controlled by a similar analysis of dietaries in families without defective offspring.

[1] *Congenital Malformations. A Study of Parental Characteristics with Special Reference to the Reproductive Process.* By Douglas P. Murphy, M.D., F.A.C.S. (12s.) Philadelphia: University of Pennsylvania Press; London: Oxford University Press. 1940.

AN OBSTETRIC EMERGENCY SERVICE

There is general agreement that obstetric emergencies should, as a rule, be transferred to a hospital as soon as may be practicable, in order that the patient may have the benefit of its organization and of its full resources. There are, however, certain states of emergency in which the patient is so near to death as to be unfit, at the moment, to bear the additional strain which transport, even under the best conditions, might entail. She needs in fact expert care and treatment at home before being transferred to hospital. To meet the requirements of this small but very urgent class of case an emergency obstetric service has been organized by several maternity hospitals and by some county authorities. The number of cases dealt with may be small, but it is to be remembered that all are in grave danger, and if they are to be saved assistance must be made available for them with promptitude and certainty. A report on the work of one of those emergency services, covering a period of about two years, was presented to the Edinburgh Obstetrical Society not long ago by the obstetric consultant to the Ayr County Council.[1]

An emergency domiciliary service can hardly be established otherwise than as a part of the organization of a maternity hospital or of the maternity unit of a general hospital. The emergency staff must be always at command, both day and night, the head of the service being specially qualified for the work; means of rapid transport of the staff to the patient's domicile is of primary importance, and an ambulance must also be available whenever it may be required. Such an organization is obviously more difficult to maintain in rural than in urban areas, and the arrangements made for the County of Ayr are therefore of especial interest. During the period covered by the report 34% of the calls received were for cases of post-partum haemorrhage, 50% for cases of difficult labour. Out of twenty-six cases of post-partum haemorrhage two died in spite of treatment and one before treatment could be begun. It is noteworthy that in seven of these twenty-six cases the placenta was found still *in situ* and was manually removed. For more than half the cases blood transfusion was carried out, and it was not found necessary to remove one of the twenty-six to hospital. Out of forty-three cases of difficult labour all but six were dealt with at once in the patient's home; six were removed to hospital for delivery by a major operation; there were no maternal deaths, and only three infant deaths, two being cases

[1] W. J. C. Morris, *Trans. Edin. obstet. Soc.*, vol. lix.

of anencephaly, the other a shoulder presentation. In addition to the above there were a small number of cases of ante-partum haemorrhage, abortion, and perineal laceration. It is a striking tribute to the efficiency of ante-natal supervision in Dr. Morris's area that no single call to a case of eclampsia was received during the period under review, and it is permissible to assume that there would have been fewer calls to cases of post-partum haemorrhage if the principles of prophylaxis and of management of this complication had been more widely understood. It is evident that a considerable number of maternal deaths were averted through the work of the Ayr emergency service.

Dr. Morris has given close attention to the organization of both the personnel and the material required for the service, so that there may be no delay whatever at the centre when a call into the county has been received. The basis of his plan is the collection into "packets," which can be kept separate, of the dressings and instruments required for different classes of emergency. A Clover crutch and a vulval preparation packet are taken in all circumstances; special packets are also kept ready for haemorrhage, forceps delivery, craniotomy, lacerations, and abortion. The nature of the case being known, a selection can be made of the packets likely to be required, and not a moment's time is lost in assembling what is wanted. The whole material is in the keeping of the maternity sister, who is responsible for sterilization and for re-sterilization of dressings and instruments as may be required. Details and illustrations of the equipment are given in Dr. Morris's paper. The emergency team should consist at the least of three persons: the obstetric specialist, the maternity sister, and a house-surgeon. All may not be required in every case, but delay in sending for additional assistance, should it be required, is to be strictly avoided, for it may militate against the patient's chances of recovery from a critical condition.

REHABILITATION AFTER INDUSTRIAL ACCIDENTS

A few weeks after the fourth International Conference of Workers for Cripples, held in London last summer, four of the principal nations which had been represented were engaged in making cripples instead of mending them. Nevertheless the report of the conference, which is now published in three languages, is of value as containing the experience of half a dozen European countries and America and Australia in the care of cripples and their rehabilitation. In passing, the hope may be expressed that in days to come when international conferences are resumed they will be on a rather different pattern, with more give-and-take discussion and some effort to reach conclusions. As things have been, an international conference generally resolves itself, as this one did, into a series of essays, each describing the arrangements and experience of a particular country—information which might have been less expensively assembled. One of the most interesting papers read at the conference was by Dr. Lauterbach, director of the National Federation of Industrial Vocational Associations in Berlin, who gave a detailed account of what Germany did for her industrial cripples. In the first place, great pains were taken, by close control of works, and by films, lectures, and exhibitions, to prevent accidents happening at all. When accidents occurred an elaborately developed procedure came into operation in order to effect a cure in the shortest possible time, or, if complete cure was out of the question, to confine the consequences of the injury to a minimum. Dr. Lauterbach said that in Germany insurance against accidents was exclusively financed by employers; unlike insurance against sickness, in which the workers contributed two-thirds of the premium. There were employers' associations, one for each trade, and it was the business of these co-operative organizations to take care that the injured worker received advice and treatment by a specialist at the earliest possible moment. It was regarded as most important that the first medical attendance on the patient should be given by a specialist versed in the treatment of accident cases. But completion of cure did not necessarily mean reinstatement, especially if the injured person had to be supplied with artificial limbs. Centres controlled by experienced surgeons had been established for severely injured persons, with the object of rendering the patients physically and psychologically fit for normal economic life. In another paper read at the conference some startling figures were given as to accidents, including industrial, traffic, and domiciliary, in the United States. In a recent year no fewer than 410,000 persons in the States suffered disablement to some degree. Rehabilitation programmes are in operation in all States except Kansas and Delaware. The average cost of rehabilitation per case is $375 (normally about £75), and after twelve months 89% of those dealt with were found to be in employment.

Along with this report of the International Conference comes the annual report of our own Central Council for the Care of Cripples. The story unhappily is largely one of frustration owing to the war. It was hoped, for example, that the projected Durham Orthopaedic Hospital would be built in 1939; the site had been purchased, but on the outbreak of war the Ministry of Health found itself unable to grant permission for the building to proceed, and the whole scheme has been held up indefinitely. Several vocational training establishments for both men and women have had to close temporarily, including the Stanmore Cripples Training College (associated with the Royal National Orthopaedic Hospital), which has been taken over by the Ministry. Sir Robert Jones's Memorial Workshops have also been temporarily closed. But the workers are in good heart, as becomes an organization presided over by that veteran lady Dame Agnes Hunt, and ready to face new responsibilities.

PATHOGENESIS OF RETINITIS PIGMENTOSA

Retinitis pigmentosa has always been a puzzle to ophthalmologists. Its characteristics—shrinkage of the peripheral vessels of the retina followed by the wax-like atrophy of the optic disks and the development of the ring of coal-black pigment—are so definite that it has been felt that there ought to be some means of staying the progress of the disease. The fact, however, that it might be familial and associated with deaf-mutism has pointed to its being something more than a localized degenerative process. In a most informative paper on the pathogenesis of retinitis pigmentosa Dr. Levy-Wolff[1] first recalls that the researches of Royle, Magitôt, Löwenstein, Blobner, and others suggested that disturbed vasomotor regulation was the causal degenerative factor, and attempts were made to meet this disturbance by sympathectomy. The results of operation were variable, some workers achieving success, others failing to do so unless the surgical procedure was accompanied by general medication such as the administration of follicular hormone, pilocarpine, and strychnine and

[1] *Amer. J. Ophthal.*, 1940, **23**, 275, 418.

phosphorus. In some instances sympathectomy without the general medication was found to be damaging. Reduction of vasoconstriction in the eye area, the author states, is not the sole result of removal of the upper cervical ganglion. The operation site is also the site of many different and important functions, including the carotid-sinus reflexes. The elimination of the nervous factor leaves the denervated heart and the denervated pupil highly sensitive to ions and endogenous pharmaca. Earlier observations of deafness, and later of hypotension, in association with retinitis pigmentosa indicated that the disease was not wholly a local condition, and this conclusion is now supported by Levy-Wolff's observation that there is also a lowering of the body temperature. The remarkably low daily peak of the temperature in this disease is considered to be an expression of the reduced specific dynamic effect, and it is pointed out that this is the reverse of what is found in fevers, when the heat-regulating mechanism is working at a higher level than when there is no infection. In retinitis pigmentosa the heat regulator seems to be adjusted to a lower level, which appears steadily to become lower as the disease advances. It is likely that the deaf-mutism found in some cases and the occasional association with the disease of epilepsy, acrocyanosis, and Raynaud's gangrene are due to the same vasomotor disturbance. The author finds that another constant factor in typical retinitis pigmentosa is cholesterinaemia. Cholesterin is thought to influence the regulation of the temperature directly through the blood, and this supposition is supported by the fact that, with advancing disease, the cholesterinaemia increases and the body temperature falls. The special place of action for the cholesterin is the wall of the vessel. Examination of the intra-ocular blood vessels in twenty-two cases showed that in all of them the primary and most serious sign of damage was in the choriocapillaris. Changes in the retinal vessels came later and were not so marked. The secondary local morbid process also did not take place in the retina, but chiefly in the choroid. The pigment is deposited in the retina exactly at the projection planes corresponding to the diseased portions of the choroidal choriocapillaris—namely, at the equatorial zone. Later, when the capillary system of the retina becomes affected, the so-called bone corpuscles are formed. Slowly the process advances from the periphery to the centre. The shape of the bone corpuscles is a replica of the smallest capillary dendritions of the retinal system. The author concludes that "sclerosis pigmentosa chorioretinalis" is not an independent syndrome but only a complex of symptoms. It is the manifestation of a malignant sclerotic vascular process restricted to the brain and the sense organs. It is actuated centrally in the hypothalamus, in the central grey matter of the third ventricle. The affection itself is hereditary and is already manifest in the germinal stage.

VIRUSES AND MICE

It might well be thought that spontaneous diseases of mice, so long as they are not transmissible to man, are of little interest to students of human pathology. Actually, a knowledge of spontaneous mouse diseases is of considerable importance, more especially in connexion with the investigation of human virus infections. Up to the present it has been impossible to cultivate viruses in the absence of living cells, and as a result in many cases the only test for the presence of a virus depends on the reactions it produces in the tissues of living animals. Especially important are the reactions in mice following intracerebral injection or intranasal instillation. Unfortunately the mouse is itself susceptible to a number of virus infections, often latent or of a low order of virulence, though capable of increased virulence after repeated passage. Some years ago, for instance, Theiler[1] described a spontaneous encephalomyelitis in mice, the pathological lesions being not unlike those found in poliomyelitis in man. More recently there have been isolated from mice viruses which on intranasal instillation into mice are capable of setting up pneumonia. At least two of such lung viruses are now known. The first was isolated in America by Dochez, Mills, and Mulliken[2] and later by Gordon, Freeman, and Clampit.[3] This virus is readily found in certain strains of mice by making rapid serial passages of the lungs at intervals of from four to five days, the inoculated mice dying with pneumonia in two to four days. The virus is pathogenic for ferrets, producing high fever and nasal symptoms in these animals, while unpublished observations show that it is, in addition, highly virulent for hedgehogs. Curiously enough it has a very poor immunizing action, and is often incapable of protecting mice against itself. More recently Horsfall and Hahn[4] have isolated a second virus from the lungs of certain strains of apparently healthy mice. This virus is avirulent as it occurs in normal mouse lungs and becomes virulent only when serial mouse passages are made at intervals of seven to nine days, death occurring eight or more days after inoculation. The virus is completely non-pathogenic for other species of animals, and in addition is an excellent antigenic agent readily immunizing mice after either intraperitoneal or intranasal inoculation. Of considerable importance is the finding that about 30% of normal human sera are able to neutralize the virus. In this connexion it must be remembered that at least two viruses definitely pathogenic for man have also been isolated from apparently normal mice. The virus of lymphocytic choriomeningitis has been found in the brains of apparently normal tame mice in America (Traub[5]), England (Findlay, Alcock, and Stern[6]), France (Lépine and Sautter[7]), and Japan (Kasahara and others[8]), and in the brains of wild mice in America by Armstrong and Sweet.[9] In Japan, Kawamura[10] and his colleagues have recently found that the virus of Japanese Type B encephalitis, a highly fatal human infection, can also be obtained from the brains of apparently normal mice. Observations also have lately shown that in addition to the true viruses mice harbour a number of strains of pleuropneumonia-like organisms. These organisms, though easily filterable and with dimensions not much greater than those of vaccinia, differ from viruses in that they can be cultivated in media rich in serum in the absence of living cells. They were first isolated from the brains of mice inoculated intracerebrally with virus containing material by Findlay, Klieneberger, Mackenzie, and MacCallum[11 12] and later in America by Sabin.[13] The majority of strains produce in mice encephalitis, arthritis, and pneumonia, but Sullivan and Dienes[14] in America, and Edward[15] in this country, have isolated from apparently healthy mouse lungs strains the pathogenic activities of which appear to be limited to the lung. Since mice are now used in ever-increasing numbers in studies of human influenza and many other viruses, it is obvious that the spontaneous infections of the mouse require full and accurate investigation.

[1] *J. exp. Med.*, 1937, **65**, 705.
[2] *Proc. Soc. exp. Biol.*, N.Y., 1937, **36**, 683.
[3] Ibid., 1938, **38**, 450.
[4] *J. exp. Med.*, 1940, **71**, 391.
[5] *Science*, 1935, **81**, 298.
[6] *Lancet*, 1936, **1**, 650.
[7] *C. r. Acad. Sci.*, Paris, 1936, **202**, 1624.
[8] *Trans. Soc. Path. Japan*, 1937, **27**, 581.
[9] *Publ. Hlth. Rep.*, 1939, **49**, 1019.
[10] *Kitasato Arch. exper. Med.*, 1940, **17**, 38.
[11] *Lancet*, 1938, **2**, 1511.
[12] *Trans. roy. Soc. trop. Med. Hyg.*, 1939, **33**, 6.
[13] *Science*, 1938, **88**, 575; 1939, **89**, 228.
[14] *Proc. Soc. exp. Biol.*, N.Y., 1939, **41**, 620.
[15] *J. Path. Bact.*, 1940, **50**, 409.

A NEW DIABETIC BLOCK

In the midst of so much destruction it is pleasant to note a new constructive effort. At King's College Hospital, London, a new in-patient block has been opened for treatment and research on diabetes and other diseases of metabolism. The large diabetic clinic there has long felt the need for a special in-patient department where not only accurate treatment but close research work could be carried out under the best conditions. The medical staff set out five years ago to raise the necessary money from diabetic patients, rich and poor, all over the world, and was able to start building three months before the war. The unit was handicapped in completion, but was opened on July 1 without any ceremony. The unit is small, but comprises wards for four patients and rooms for two patients and one patient. It has a special room for the treatment of coma, and a dining and sitting room furnished in the most gay manner. Its position is fortunately chosen, as it is two floors above the out-patient diabetic department, immediately above the main pathological laboratories, and the biochemical department is ten yards away. The unit is therefore compact and easily worked from the point of view of both treatment and research. A few rooms for private patients at moderate cost are included. The department is under the medical charge of Dr. R. D. Lawrence, who is assisted by Dr. W. G. Oakley.

PROPORTION OF FATAL TO TOTAL CASUALTIES

A rather misleading comparison has occasionally been made between air raid casualties and road traffic casualties. It was said with truth, on the basis of the figures available until the recent intensification of air warfare, that one was much more likely to meet one's death in or from a vehicle on the road than as a result of aerial bombardment. This statement must be revised in view of what the Prime Minister said on September 5 that during August 1,075 civilians had been killed in air raids, and of what has happened in London since last Saturday afternoon. On the basis of the last three years the monthly average of killed in road accidents in Great Britain is about half that number. The more important fact is, however, that battle casualties, including civilian casualties sustained in air raids, are likely to include a much higher proportion of killed to injured. In the metropolitan police area, which embraces a population of eight and a half million, the numbers of air raid casualties which are posted up daily at the town halls suggest that in the proportion of killed to injured they follow roughly the military casualties in the field. On nine successive days before the *Blitzkrieg* on London, taking the total killed and the total injured (meaning by "injured" detained in hospital), the number of injured appeared to be slightly less than two and a half times the number of killed. The totals were exceedingly small, and it is a case of comparing tens with millions, but the killed and injured did bear much the same relation as in the casualties sustained by the Forces of the British Empire during the war of 1914–18, when just over one million were killed and 2,400,000 wounded. The figures for the French forces in that war, however, were 1,400,000 dead, and the number of wounded was only 100,000 higher; the German figures gave two million dead and 4,200,000 wounded. In street accidents in Great Britain, on the other hand, the proportion of injured to killed is many times greater; in other words, for every ten persons killed in road accidents 340 are injured. In the later figures for London air raid casualties the proportion may well be different from that indicated above. It would be extremely useful to know the location and character of the wounds which cause instant death, also the position of the victim when the wounds were sustained, and the nature of the missiles inflicting them.

PASTEURIZATION AND THE PHOSPHATASE TEST

Though not officially recognized, the phosphatase test is playing an increasingly important part in the control of pasteurization. By its means it is possible to detect a lowering of 1.5° F. in the temperature or of ten minutes in the time at which the milk is held during processing, as well as the admixture of as little as 0.2% of raw milk with the pasteurized product. Very great care has to be exercised in its performance, and apart from imperfect standardization or contamination of the reagents employed, the exposure of the test substances to sunlight, the presence of tobacco smoke in the laboratory, or even the use of carbolic soap for washing the hands may affect the result. The value of the test in the routine control of milk supplies is aptly illustrated by a recent pamphlet written by Mr. Ben Davies, Director of Laboratories, United Dairies, Ltd. During the two years March, 1938, to April, 1940, of 1,544 consecutive samples of United Dairies milk taken by sanitary inspectors—samples representative of 1,000 million bottles of milk—all but thirty-two passed the test satisfactorily. Reasons are given for believing that the failures were due mainly or entirely to improper sampling of the milk, particularly the use of a jug that had previously contained raw milk. Examinations by health authorities in different parts of the country have now shown the freedom from tubercle bacilli of milk pasteurized by the large dairy companies. The present results with the phosphatase test add confirmation to these findings.

Sir Arthur Hurst will give the eighteenth Norman Kerr Memorial Lecture before the Society for the Study of Inebriety on Tuesday, October 8, at 4 p.m., in Friends House, Euston Road, N.W. His subject is "Alcohol and the Organs of Digestion."

By an Order of the Committee of Privy Council the Rt. Hon. James Gray Stuart, M.P., has been appointed a member of the Medical Research Council in the vacancy caused by the resignation of Mr. R. K. Law, M.P. By another Order, made after consultation with the Medical Research Council and with the President of the Royal Society, Sir W. Wilson Jameson, M.D., F.R.C.P., Dean of the London School of Hygiene and Tropical Medicine, has been appointed a member of the Council in succession to Prof. Matthew J. Stewart, M.B., F.R.C.P., who retires in rotation on September 30.

The Medical Research Council has received a valuable gift of four motor vehicles, specially equipped for medical work, which have arrived in this country from the United States. These were originally purchased by the American Quakers and the International Commission for the Assistance of Child Refugees with a view to use in France. The vehicles are to be used principally in the work of the emergency blood supply depots in the neighbourhood of London which have been organized by the Council on behalf of the Ministry of Health.

Nova et Vetera

CULTURAL TRENDS IN THAILAND

The word "Siam" has disappeared since the date February, 1939, when *Siam in Transition*[1] was written, and that country is now known and referred to as Thailand—Maung Thai, the Land of Free Men. Little has been published in English on any phase of Siamese life since the revolution of 1932, which suddenly transformed the last absolute monarchy in Asia into something approaching a democracy. Professor Landon set himself to remedy this defect and has sought the best sources of information for his material. We can find no evidence throughout the book that the author has visited or lived in Thailand: his work would appear to be a scholarly analysis of authoritative reports, and it gives a reliable picture of the changing conditions that are affecting the country and its people. The introduction recounts the history of Thailand and describes the inhabitants, their language, and the climate. From that basis the author proceeds to show how matters are progressing, in a series of chapters on political trends, economic, ethnic, educational, medical, and religious trends, and in each one the pros and cons of the subject are attractively discussed.

It would not be unjust to describe Thailand as a backward country which has only recently awakened to modern political demands. An aspect of Siamese character is lassitude and lethargy. "Whatever of this spirit cannot be traced to such diseases as hookworm can probably be blamed on the climate and on the ease with which one can secure enough to eat."

Thailand is underpopulated, largely because of the high death rate. It is so warm that clothing is of no great importance. "A peasant will work for a limited time, but when he has money in his pocket he prefers to sleep, gamble, and enjoy life in his own way. The idea of working every day simply to add to his wealth seems absurd."

The trend towards modern medicine is along a stony path full of empiric obstacles, but it is gaining steadily if slowly, and the Government Department of Public Health is active. It planned and carried out an eleven-year programme of national vaccination and has given two million treatments for hookworm, much needed in a population that showed 65 per cent. of this infection. We would not be wrong in regarding Thailand as a paradise for the research worker in tropical diseases.

A PROLONGED FAST

In the *Annual Register* for 1774 a case "as curious as it would be incredible if it was not well attested" is described from Rottweil, in Württemberg. It was the case of a married woman named Monica Mutscheteria, 37 years of age, and the mother of six children, who had suffered from a nervous disorder and had become at length so weak that for two years she was obliged to make use of crutches and for the third year was confined to bed. During the first two years of her disorder she could take only a little curds and whey and water, but during the third year, for a whole twelvemonth, she took no nourishment and no drink whatsoever. It is also stated that during these three years she had not slept for a moment. She spoke distinctly, though in a rather low voice; she had hearing and sight and could read, but had no sense of feeling save in her hands. The lower part of her body was motionless and appeared as if dead. Except for the particle of the Eucharist, which she received every four weeks at least, she could retain nothing. On one occasion she was compelled to take a little broth on the yolk of an egg, but it provoked such violent retching that it was feared she would die. Her eyes were clear, her lips a faintish red, her tongue as fresh-coloured and as well-looking as if she were in perfect health; her face was not disagreeable, and she exhaled no offensive smell, "though for a year past she has had no evacuation by stool or urine, and though during the year she has had her bed made but thrice, and now even this is impracticable through her extreme weakness."

[1] *Siam in Transition: A Brief Survey of Cultural Trends in the Five Years since the Revolution of 1932.* By Kenneth Parry Landon. (Pp. 328; 10s. 6d.) London: Oxford University Press.

Correspondence

Immobilization for Infected Wounds

SIR,—Dr. Ronald Hare suggests (August 17) that one reason for the innocence of streptococcal infections in wounds treated by the closed plaster method may be the fact that the strains of streptococci that appear do not belong to the virulent group A. Unfortunately no information is available regarding the groups of the streptococci isolated from the cases of one of the writers in Spain.

During the last few weeks two cases of compound fracture treated at the Wingfield-Morris Hospital have grown streptococci after the plaster had been changed; they were both group A strains, yet in neither case was the patient affected by the appearance of these organisms. Another case is a more striking illustration of the importance of the method of treatment rather than the nature of the infecting organism in determining the condition of the patient. A soldier was admitted to the hospital in a very poor general condition suffering from streptococcal septicaemia (proved by blood culture) that had resulted from a compound fracture of the femur treated elsewhere by primary suture of the wound. The wound was opened up and adequate drainage secured by débridement, and the limb then totally enclosed in plaster. The patient's temperature fell and his general condition rapidly improved, and the septicaemia cleared up. In this case the organism must have been a virulent one, and yet when the wound was placed under favourable conditions the infection at once ceased to threaten the patient's life.

Whenever the plaster is changed every step should be taken to reduce the chances of the wound's becoming infected by streptococci from human sources, and the more virulent the infecting organism the greater the danger of a reaction on the part of the patient. The sulphanilamide compounds are of help in these conditions. Nevertheless we believe that the deciding factor as to whether an infection of a wound will have serious consequences or not is the condition under which the wound is placed rather than the virulence of the infecting organisms.—We are, etc.,

J. TRUETA.
J. M. BARNES.

Wingfield-Morris Orthopaedic Hospital,
Oxford, Sept. 2.

Prevention of Tetanus

SIR,—An annotation in your issue of August 10 (p. 196) draws attention to the possibility of now assessing the value of new methods of treatment of casualties. In particular it refers to the fact that there ought to be available at the present time information regarding the incidence of tetanus in such casualties as have occurred. The following remarks on this subject are, therefore, pertinent.

In the present war the prophylaxis of tetanus differs in one important respect from the measures adopted in the war of 1914–18 in that active immunization by means of tetanus toxoid is employed. Approximately 80% of the whole of the British Expeditionary Force was protected by this means. This procedure was introduced into the Army one year prior to the outbreak of hostilities, and despite the fact that it is on a voluntary basis, as are all forms of immunization in the Army, it was possible to achieve this high percentage of protection of the Force.

Full reliance is not, however, placed on active immunization owing to the possibility of an indifferent individual response, and also to the fact that some 20% of the Force had not been inoculated. For the above reasons the policy has been adopted that every casualty should receive, as soon as possible after the infliction of a wound, 3,000 International units of tetanus antitoxin, irrespective of prior immunization. In the circumstances that arose in the recent campaign in France and Flanders it is evident that it was not possible in the majority of cases to administer this prophylactic antitoxin, although adequate supplies were available. The position was indeed comparable to the opening phases of the 1914–18 war, when tetanus antitoxin was not available in

sufficient quantities, or could not be administered owing to the military situation. Prevention of tetanus in recent casualties was therefore dependent upon the degree of immunity conferred by the tetanus toxoid.

On the outbreak of war Army Forms for reporting cases of tetanus were distributed to all military hospitals both at home and abroad, as well as to the Emergency Medical Service Hospitals in this country receiving convoys. These reports have now been rendered, and it is possible to give the approximate reported incidence of the disease.

Compared with the first three months of the war of 1914–18, when the incidence was about 8 per 1,000 wounded, the figure in the present war is 0.45 per 1,000. It is significant that such cases as have been noted have occurred in individuals who have not been actively immunized. Among casualties of the British Expeditionary Force there has been no reported instance of tetanus in soldiers protected by means of tetanus toxoid. It is only fair to remark that a number of wounded received prophylactic doses of tetanus antitoxin subsequent to their arrival in this country—that is to say, two or three days after the infliction of the wound.—I am, etc.,

H. MARRIAN PERRY,
Director of Pathology.

The War Office, Sept. 6.

A Safe and Simple Tourniquet

SIR,—On the rare occasions when a tourniquet must be used as a first-aid measure there is nothing to beat half an old cycle inner tube turned inside out. This improvised elastic bandage is wound tightly round the arm or leg, the operator's thumb being covered by the last turn. The end can easily be tucked in when the thumb is lifted. The obvious advantages are efficiency, ease of application, absence of damage to underlying tissues and, last but not least, cheapness. It costs nothing, for any cycle dealer will gladly present any of your readers with an armful of old inner tubes, which he cannot sell. Rolled up and secured by an elastic band made of a section across the tube, this handy tourniquet packs up as a little cylinder 2 inches long by 2 inches in diameter. One should be in every first-aid outfit, and in the "cubby-hole" of every doctor's car.—I am, etc.,

J. VINCENT BATES.

West Malling, Kent, Sept. 2.

Protection of the Auditory Apparatus from Noise

SIR,—Under the heading "The Problem of Noise" Dr. Redmond Roche (August 3, p. 166) has called attention to the urgent need that the lay public of this country should be instructed in regard to their personal protection against the harmful effects of noise arising in warfare. From conversation with those who have returned with our Expeditionary Forces from Western Europe it is apparent that excessive noise, and the exploitation of this psychological weapon by the Germans, undoubtedly contributed very considerably to the deterioration of the morale of the civilian population of the invaded countries.

Briefly, the harmful effects of the undue noise may result either in local trauma of the tympanum and/or cochlea; or in general psychological, or even psychotic, disturbance. The former lesions appear to have been *relatively* infrequent in the present war, and they have been fully described in medical literature; the nervous sequelae, however, have resulted in widespread disaster, but they have received scant attention, as pointed out by Dr. Roche.

The purpose of this letter is not to discuss the harmful results of the noises of warfare amongst the civilian population, but rather their prevention by adequate protection of the auditory apparatus. The perfect "ear defender" has not yet been devised, but at some time or another the use of one of the following has been advocated: (1) cotton-wool impregnated with soft paraffin (petroleum jelly); (2) plastic materials; (3) vulcanite and rubber obturators.

(1) *Cotton-wool and soft paraffin* has the advantages of cheapness and easy acquirement, and if properly used it is an excellent baffle. For the present purposes, however, it presents serious disadvantages: it is inconvenient to carry continually, and it is messy and very difficult to apply effectively, even by an expert. If it *is* used it should be moulded as shown in Fig. I.

(2) *Plastic materials*—such as "ohropax," "plastaplugs," "antiphones," "boules quies," etc. (Fig. II)—are composed of cotton-wool and plasticine or similar substances, or of cotton-wool and beeswax. Criticisms of the use of these resemble those quoted in (1), but in addition pieces of the material may break off and fall into the deep meatus. They are, however, more portable, but they are difficult to insert, and they must be moulded as shown in Fig. IIA.

(3) *Vulcanite and rubber obturators*—such as "Mallock-Armstrong," "lilo," "simplex," "aurax" ear defenders, etc. (Fig. III)—are undoubtedly the most satisfactory instruments. Various types and sizes are obtainable, but they are expensive.

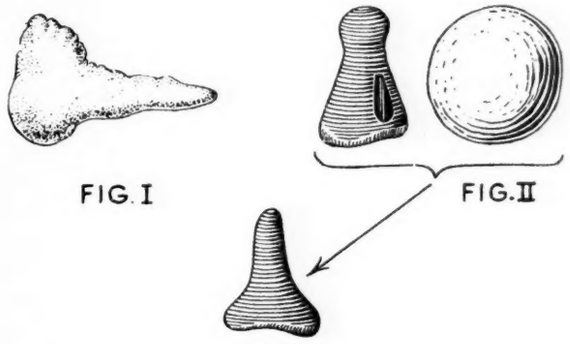


FIG. I FIG. II FIG. IIA

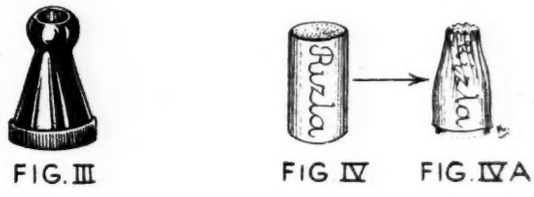


FIG. III FIG. IV FIG. IVA

FIG. V

easily lost, certainly uncomfortable for wear during sleeping hours, and it is doubtful if they could be produced in sufficient numbers to equip all members of the civilian population.

Recently it was suggested by Squadron Leader J. R. Gardiner, R.A.F., that *cigarette filter-tips* of the "rizla" type—cotton-wool in thin paper wrapping (Fig. IV)—would fulfil most of the aural and economical requirements of an efficient "ear defender," and after adequate trial in suitable conditions these have been found to be of easy application and to afford excellent protection from undue noise. For

insertion one end of the filter-tip is rolled between the index finger and thumb, and the tapered end (Fig. IVA) is then gently pushed into the meatus. The retail price of these filter-tips is 3d. for 120, and they probably could be obtained on wholesale terms at considerably less cost, so that if damaged after use they could be discarded and quite cheaply replaced.

For the correct insertion of *any* "ear defender" it is essential that the external auditory meatus should be straightened by traction of the auricle in an upward and backward direction. A simple method of achieving this is to grasp the pinna with the fingers and thumb of the contralateral hand, as illustrated in Fig. V.

I would suggest that the Ministry of Home Security should distribute free of charge to every householder a leaflet stressing the importance of aural protection, and advising the most suitable "protector" to be used and the method of its application. "Protectors" should be carried by *all* civilians in their respirator container, and they should be available free of charge from local A.R.P. centres to those in poor financial circumstances.—I am, etc.,

JOHN E. G. MCGIBBON,
Sept. 7. Squadron Leader, Auxiliary Air Force.

New Arm Sling

SIR,—I feel it is worth making more widely known a new type of sling which has recently been accepted for use by the Red Cross and has found popularity in this neighbourhood.

The photograph illustrates the general arrangement of the sling, whose chief advantages are: (1) That the weight of the arm is supported by the shoulder and not the neck. (2) Comfort in use and ease of adjustment. The sling may be used for either arm. Its retail price is 3s., and orders should be addressed to "Mead," 78, Spa Road, Weymouth.—I am, etc.,

Weymouth, Sept. 2. D. J. ROSS STEEN, F.R.C.S.

Papers on Air-raid Injuries

SIR,—May I emphasize the value of first-hand detailed accounts of current air-raid injuries, such as those by Messrs. A. R. Hodgson and G. K. McKee (August 3, p. 147) and by Mr. S. M. Cohen and by Dr. Stephen T. Falla (August 24, p. 251 and p. 255 respectively), and add an urgent plea for more. Anyone (and there must be many people) who may be called upon at any moment to deal with such injuries, and who turn to the various publications on war and air-raid surgery recently brought out for his guidance, will find that they are largely written on the experiences of 1914–18. But while some of this experience is valuable, much is obsolete. New methods of warfare and of treatment have been developed, new problems of organization created. It is most instructive and helpful to have accounts of work done during the present raids when the results are more or less applicable everywhere. I hope that everybody combining the necessary experience, energy, and leisure will hasten to add his personal contribution to this important topic.—I am, etc.,

Royal Infirmary, Cardiff, Sept. 6. W. H. GRAHAM JESSOP.

First-aid Lectures

SIR,—Having read the letters on first aid, we would like to make the following suggestion. Let the various societies concerned get together and issue a special wartime certificate for first aid suitable for A.R.P. workers. Let them issue a syllabus containing only the essentials that are likely to be met and omitting all the "frills" such as snake bite, hydrophobia, etc. Some special items could be added in the light of recent experience. An examination on these lines would determine the capabilities of a candidate, and on posting the candidate to a unit the real teaching would commence. At present we are being asked to find out these capabilities on such asinine questions as "How do you treat centipede bite?" and "How would you treat haemorrhage from under a finger nail?"

If this were done the present course of six lectures and demonstrations would be sufficient: an important point when these voluntary workers have to take a course of gas lectures as well.—We are, etc.,

H. DUNDAS MCCALL,
Div. Surgeon, St. J.A.B.
HENRY ROSENBERG,
Worthing, Sept. 3. Surgeon, B.R.C.S.

Practical Results of Immunization against Diphtheria

SIR,—What immunization can accomplish in abating diphtheria is shown by the remarkable drop in incidence of the disease in Brisbane, Queensland, Australia. The local authority of Brisbane, the city under review, has an area of 375 square miles and a population of 326,000. In January, 1938, I decided to make every effort to speed up the council's free immunization service. I used every available means to impress upon parents the importance of having their children—*especially their children of pre-school age*—immunized. The response exceeded my most sanguine expectations. In this two-and-a-half-year period—namely, from January, 1938, to June 30, 1940—the council's department of health has fully immunized 13,327 children. This rate of immunization, which is averaging more than 5,000 per annum, is, in the period under review, slightly in excess of the birth rate. To this must be added an unknown but considerable number of children immunized by private practitioners in Brisbane, and I am pleased to be able to state that, as I write, the response of children shows no signs of abatement. I am in a position to state that at least 50% of this total are children of pre-school age.

The maximum incidence of the disease occurs during the second, third, and fourth years of life, and as large numbers of immunized children of this age group are appearing in increasing numbers every day in Brisbane, the incidence of the disease now shows the anticipated spectacular fall. Here are the figures for this period:

	1938 (Population 325,890)	1939 (Population 326,000)	1940 (Population not yet compiled)
January ..	23	27	21
February ..	44	36	19
March ..	37	44	13
April	43	53	11
May	40	60	9
June	66 (½ yr. 253)	74 (½ yr. 294)	18 (½ yr. 91)
July	48	53	
August ..	28	33	
September ..	29	40	
October ..	24	38	
November ..	33	19	
December ..	44	28	
	459	505	91

These figures show that immunization has cut diphtheria to one-third of 1938 and 1939 figures; so, with parents now educated in Brisbane to have their children immunized when they reach the age of 1 year and with immunization proceeding as at present, the eradication of the disease in the city is within reach.—I am, etc.,

RALPH WEAVER,
July 3. Medical Officer of Health, Brisbane.

Virus Tumours in Animals

SIR,—In connexion with your annotation on the above in the *Journal* of August 24 (p. 265), it is appropriate to quote a passage from a letter by myself in the *Journal* of March 26, 1938 (p. 698). Speaking of Rous's work on Shope's rabbit tumour I say: "We have here a case in which a particulate virus, in the fulfilment of its destiny inside the epithelial cells of the rabbit, irritates and stimulates them, causing thereby an increase of their functional activity, which is followed by a multiplication of the cells themselves. At first, owing to the cell proliferation, there is formed a simple papilloma, which is capable of malignant transformation when more prolonged irritation (the 'remote' cause) produces a genic mutation, which then becomes the 'proximate' cause of the subsequent permanent malignant state of the cells. . . . As long as the condition remains in the simple papillomatous stage there is little necrosis of the epithelial cells, therefore little escape of the virus into the tissues, and hence little formation of antibodies against it. With carcinomatous change, however, there is considerable necrosis, considerable escape of the virus, and, as Rous has shown, though not in this context, the formation of antibodies against the virus. It should not be surprising if, after the process of trituration of such a tumour for the purpose of preparing an emulsion for filtration—in which case the liberated virus must come in contact with the antibodies of blood and tissues—a filtrate is obtained which on inoculation is completely inactive."

Obviously this extract has a considerable bearing on some aspects of your discussion, but I confine my remarks to one point. From the information you supply it would seem that one of my suggestions (regarding the presence of antibody in the tumour) has been substantiated.—I am, etc.,

Aberdeen, Aug. 28. J. P. MCGOWAN.

Cause of Appendicitis

SIR,—Dr. E. Sakoschansky's letter in your issue of August 24 (p. 267) revives memories of various correspondences in the latter years of last century and the early years of this in which I took part. Neither the general increase in our knowledge nor my own limited further experience has caused any material change in the views I expressed then. Put dogmatically those views were and are:

(1) A normal appendix rarely becomes acutely inflamed; an acutely inflamed appendix almost always presents some evidences of previous morbidity, and the history of the patient, when it can be thoroughly investigated, almost always reveals evidence of abdominal trouble in past years, generally in infancy or childhood.

(2) The immediate cause of the acute attack is trauma, either external, as suggested by Dr. Sakoschansky in his last paragraph, or internal, such as foreign bodies, undigested food, faecal accumulations, or stercoliths in the caecum. Gout, rheumatism, and some other chronic conditions or tendencies have been blamed for acute attacks, but it is much more reasonable to regard a morbid appendix as at least a contributory factor in the development of these conditions than to regard it as the result of them. Acute fevers like influenza have also been blamed, and the chills which accompany them may possibly be the immediate traumatic agent.

(3) Trauma is also the cause of the morbidity which ends in an acute attack, and this trauma occurs usually in infancy or childhood, though it may occur later. The seeds of appendicitis are sown generally in the cradle, fairly often during early childhood before the second dentition is complete, and more rarely in later life, and those seeds are improper foods—that is, foods which cannot be properly digested and absorbed by the developing but undeveloped apparatus available at the different ages. The fashion of denying babies their natural food and substituting "patent" foods (just as good!) came into vogue in the middle of the last century, first among the upper classes, then in the middle, and eventually in the working class, and in due course appendicitis, almost an epidemic, began to take its toll, first among the younger adults and children and, as time went on, among the middle-aged and elderly who had been born during the prevalence of that vogue. Along with this fashion there was a growing carelessness about the diet of the elder "babies," and those who escaped the ravages of hard curds in the cradle were subjected to the ravages of fried fish, hard ham, potato chips, and similar dainties long before they could deal with them effectively; hence natural feeding in infancy is not a complete safeguard against appendicitis in after-life. Unfortunately the reaction towards natural feeding in the cradle has not yet been followed to any great extent by a similar reaction in the case of the older children. If and when such a reaction does occur appendicitis will, in the course of a generation or so, become rare, as it was a century ago. It is a mechanical or physical rather than a chemical question. No amount of vitamin added to hard curds, fish, ham, chips, etc., will prevent those foods from irritating a child's appendix, and repeated irritation produces morbidity of one kind or another, and paves the way to appendicitis.

I have a strong impression, which may be quite wrong, that there is much less appendicitis about than there was in my young days. If I am right I attribute this chiefly to the reaction in favour of breast-feeding, but partly also to the attention now given to the teeth of young children, neither of which has yet had time to produce its full effects. If I am wrong I suppose we shall still have to find some more vitamins, but in the meantime it would be quite worth while to continue to study the mechanical agencies involved and insist on the necessity for children to have food physically as well as chemically appropriate to their digestive apparatus.—I am, etc.,

Ambleside, Aug. 26. J. PRICE WILLIAMS, M.D.

Haematuria after Streptococcal Infection

SIR,—Quite recently in this area we have had a considerable number of cases of haematuria, in some instances following an obvious tonsillitis. The majority of the cases have been in quite young children, but three or four have occurred in adult females. These patients seem remarkably well and are able in the initial stages to attend the surgery. After treatment in bed on diet and liquids and, if necessary, alkalis the condition clears up. The patients, despite exhaustive clinical examination, which shows negative results so far as disease goes, are obviously not fit persons. This may be due to the rather strict diet, since they improve when the diet is increased in gradual stages to a very normal average diet.

The interest to me is that the last time I saw a series of cases of this nature was in Wolverhampton, when the condition was concurrent with a severe whooping-cough epidemic. The only germ that seems common to these present cases is a streptococcus, which, owing to the war, has not been typed. The cases I have handled have not proved fatal, and indeed have not had any high temperature or signs of an acute inflammatory reaction.

If anyone else has a similar experience I would be pleased to know, especially since I am unaware of any help as to ultimate prognosis (for example, literature). I would like to follow this up.—I am, etc.,

Torpoint, Cornwall, Aug. 30. GEO. S. ASTON.

Sulphonamides in Treatment of Bacillary Dysentery

SIR,—In your issue of June 22 (p. 1023), in an article on bacillary dysentery in war, you state *inter alia*: "Up to the present the sulphonamide group of drugs does not appear to have been used in the treatment of acute bacillary dysentery in man." In this part of the world we see quite a number of cases of this formidable infection at certain seasons, and during the past year I have personally employed soluseptasine and proseptasine (M & B) in the treatment of seven authenticated cases. All were checked up with laboratory stool culture and tests through the sugars. Three were returned as Flexner, two Morgan, one *asiaticus*, and one pseudo *carolinus*.

The results of treatment have been more than encouraging, and all seven patients, who were showing the usual picture of high temperature, frequent stools with blood, mucus, pus, etc., were back to a normal state of bowel action within ten days of the institution of treatment. Subsequent stool culture in each individual case showed no evidence of persistence of infection, and continued clinical well-being confirmed this. Dosage was 5 c.cm. soluseptasine parenterally daily, combined with six tabloids orally for five days.

Admittedly this is a small series of cases (all that have been encountered), but I have been so impressed by the results that I have already forwarded a note of the treatment to the D.G.M.S., S. African Forces, with the suggestion that further trial should be carried out with cases occurring in the Field. Should it be confirmed that it is possible to reduce an illness of weeks to one of days, then another brilliant achievement must be credited to the sulphonamides.—I am, etc.,

Durban. J. DRUMMOND, M.D., F.R.C.P.Ed.

Nurse Anaesthetists

SIR,—For some little time there has been a feeling that anaesthetists are getting ideas quite beyond their station. Some anaesthetists have even gone so far as to make the monstrous suggestion that anaesthesia is actually a special branch of medicine and that the skilful administration of the anaesthetic is of importance equal to the skilful performance of the operation.

The medical committee of Addenbrooke's Hospital, Cambridge, is to be congratulated on its determined attempt to put these gentry in their proper place, and it is to be hoped that the appointment of nurse anaesthetists will show how little importance is attached to the art and science of anaesthesia in the university town of Cambridge. Oxford has gone to the ridiculous extreme of appointing a professor of anaesthesia; Cambridge is not to be led away by indiscreet enthusiasms.—I am, etc.,

New Barnet, Sept. 2. JOHN ELAM.

Obituary

NATHAN RAW, C.M.G., M.D.

Late Lord Chancellor's Visitor in Lunacy

Dr. Nathan Raw, well known for his work on tuberculosis and also in the field of medical psychology, and a one-time member of Parliament, died in London on August 28. He was 74 years of age, but until his illness, which incapacitated him for the last year of his life, he might have been taken for a man much younger. He received his medical training at the University of Durham (College of Medicine, Newcastle-upon-Tyne), where he gained honours in several subjects. In 1888 he qualified, and showed the bent of his interests by taking also in that year the London certificate in psychological medicine. In 1891 he took the M.D. of Durham. A number of asylum and hospital appointments followed, at Liverpool, Portsmouth, Bolton, and elsewhere, and in 1893 he was medical superintendent of the Dundee Royal Infirmary.

On the treatment and after-care of tuberculosis in this country Nathan Raw was one of the pioneers. He was interested also in the aetiology of the subject. About 1906 he started his well-known cultures of tubercle bacilli of the human and bovine strains, and these he kept going for very many years, if indeed they are not still in existence. He had strong views, not generally shared, on the mutation of strains. He met Koch on several occasions, and as a member of the International Committee for the Prevention of Tuberculosis he frequently attended conferences in other countries, and he was well known and highly regarded in the United States. He was consulting physician to the Margaret Street Hospital for Diseases of the Chest and to the Preston Hall sanatorium colony for ex-service men, Aylesford, an early adherent and member of council of the National Association for the Prevention of Tuberculosis, and a past president of the Tuberculosis Society of Great Britain.

During the last war Nathan Raw served as lieutenant-colonel and commanding officer of the 1st Western General Hospital, Lancashire, and also as commanding officer and senior physician of the Liverpool Hospital of the B.E.F. in France. After the war he entered Parliament as Conservative member for the Wavertree division of Liverpool, but he retired at the dissolution in 1922, when he was made Lord Chancellor's Visitor in Lunacy, a post which he held almost until his death. In 1929–30 he was president of the Royal Medico-Psychological Association, and for some fourteen years chairman of its Parliamentary Committee. He was also a past president of the Hunterian Society. Of the British Medical Association he had been a member for more than fifty years, and at the Annual Meeting at Liverpool in 1912 he was honorary secretary of the Section of Navy, Army, and Ambulance. Several publications, dealing chiefly with tuberculosis and with insanity, issued from his pen, and it is interesting to find him nearly forty years ago writing on the relation of mental symptoms to bodily diseases. He gave evidence before the Royal Commissions on arsenical poisoning, on the care of the feeble-minded, and on the reform of the Poor Law.

Nathan Raw was a man of engaging personality and an attractive speaker, and will be widely missed. He married in 1897, and had two sons and one daughter.

JOHN E. PELLOW, M.A., M.B., B.Ch.

Dr. John Edwards Pellow, of Kingsclere, Newbury, who died on August 22 at the age of 61, studied medicine at St. John's College, Cambridge, and St. Thomas's Hospital, taking the English Conjoint qualifications and his Cambridge medical degrees in 1904.

G. C. L. writes: The passing of Pellow of Kingsclere will be felt as a very real personal loss by his wide circle of patients and friends. The time-honoured saying, "Those whom the gods love die young" was particularly justified in his case. Though not strictly speaking young in years, he retained throughout life the courage, cheerfulness, zest of living, and camaraderie which are the characteristic qualities of youth. In that sense he was, indeed, young when the end came. Those who remember him as an undergraduate and met him again in later life will agree that "the boy was father to the man." The same sturdy, steadfast spirit which stood him in good stead in rowing for his college inspired him in all the relations of life which were to follow. When Cambridge days had passed he settled down to the more serious business of graduating in medicine. That accomplished, he fulfilled ably resident appointments at the Preston Hospital. From 1907 to 1914 he practised at Wadebridge, Cornwall. He disposed of the practice to join the R.A.M.C. for service during the war of 1914–18, in which he served his country well and attained the rank of major. He returned to civil medical practice in August, 1919, at Kingsclere, Berkshire, where he became greatly esteemed, not only for his medical skill and judgment, but also for his qualities as a sportsman in the best sense of the word. He was so thoroughly English in his outlook, so genuine, and so reliable in every way that his passing creates a gap not easily filled. He upheld well the traditions of his profession and thoroughly deserved the confidence and affection which were bestowed upon him.

Mr. A. Norman Hooper writes: I met Dr. J. E. Pellow for the first time in 1916, when we were both on the staff of the 33rd Casualty Clearing Station in France. Our association became closer when he was appointed anaesthetist to a surgical team of which I was surgeon. For two years we wandered up and down the line together, pitching our operating table wherever there was a "show" on. I realized at once how fortunate I was, for not only was Dr. Pellow a most capable anaesthetist but, what was almost of more importance, he was one of the most cheerful and best companions I have ever met. Nothing ever rattled him, whether we were being bombed or shelled or overwhelmed by a convoy, and this, together with his habit of cheerfulness and thoughtfulness, made him universally popular, not only in the mess but with all members of the unit, as well as with the patients under his care.

Major-General J. H. Beith ("Ian Hay") writes: I remember J. E. Pellow well. He was short, sturdy, and easy-going, and incurably good-tempered. In my mind I always picture him in company with three other men of much the same height and build—Bushe Fox, the Nestor of our College Boat Club; A. R. Ingram, who is now, I believe, a pillar of the Church; and H. E. H. Oakeley, the boat captain. The

only non-rowing man of the four was Ingram, who was a distinguished cricketer and Rugby football player. But all four met upon common ground upon the tennis court, and a very hot four they were. In my fourth year I coached Pellow and two other friends for what was then known, and probably still is, as the General Examination for the ordinary B.A. degree—an omnibus affair which included among other subjects the Greek Testament. Since none of the trio knew a word of Greek, my difficulties were considerable. However, I took on the job. The usual fee upon these occasions was £9 a term, but, under a sporting arrangement among ourselves, it was agreed that I was to receive two guineas per head and a complimentary dinner if my pupils passed. They did pass and I got my dinner, though it took me the best part of a term to collect the two guineas per head. I have one other recollection of Pellow. He was a perpetual cigarette smoker. Chain smoking is not good for the lungs, as Pellow discovered to his cost when rowing. Indeed, towards the end of a full-course trial, though he continued to ply his oar with unabated energy, he filled the air with groans and wails and appeals to stroke to stop. Selected parties used to assemble on the towpath to run beside the boat and listen to him. Finally he made a resolution that in future he would never smoke until after lunchtime. He fulfilled his resolution triumphantly, but only by staying in bed until that hour. And now comes the news of his death. I had not seen him for many years, but that does not alter my regret that such a good friend has gone from us. Never was there a more congenial companion or a more sterling character.

E. W. W. CARLIER, M.Sc., M.D.

Emeritus Professor of Physiology, University of Birmingham

Prof. Edmond William Wace Carlier, who died in his sleep at Dorridge, near Birmingham, on September 2, was born in Norwich on October 24, 1861. He was the son of Antoine Guillaume Carlier, Officier d'Académie, Membre de la Société des Gens de Lettres, poet and dramatist, and his wife Mary Ann, *née* Hipper.

He was educated at King Edward VI School, Norwich, the Lycée de Valenciennes, and the University of Edinburgh. Owing to his early delicacy and a variety of accidents, ranging from a fractured skull to a broken leg, he made little progress at school, to his ultimate advantage, for he was able to devote much time to the development of his bent towards natural science while hardier boys were more conventionally occupied on the playing fields and in the classroom. During his frequent absences from school he contrived to become a good swimmer and boatman. At the age of seventeen he was sent to the lycée at his father's birthplace, Valenciennes, where, after studying the classics for two years, he was able to change over to the science side of the school. In 1882 he obtained the Baccalauréat ès Sciences. Meanwhile he had profited much from his cadetship in the French Dragoons, whose excellent training in fencing (he became a maître d'armes), riding, drill, and gymnastics had transformed him into a well-developed, strong, and healthy man. On his twenty-first birthday he began his medical studies in Edinburgh, graduating M.B., C.M. with honours in 1886. Thereupon he was invited to join the junior teaching staff of the university in the department of physiology. It was during his tenure of this appointment that he pursued his researches into the physiology of hibernation. He graduated M.D. with first-class honours and gold medal in 1891. In 1895 he was promoted to a senior lectureship in the same department and soon after married. Upon the death of Prof. Rutherford in 1899 he acted as interim professor, but was almost immediately appointed to the vacant chair of physiology at Mason College, which became the University of Birmingham at the beginning of this century.

Prof. Carlier was honorary secretary of the Scottish Microscopical Society from 1892 to 1899 and vice-president for one year. He was vice-president of the physiological section of the British Medical Association, Ipswich (1900) and Birmingham (1911), and president of the Birmingham Natural History and Philosophical Society about seven times in all. He was a Fellow of the Royal Society of Edinburgh and of the Royal Entomological Society. From childhood on he was always an ardent entomologist. Perhaps his most durable contribution to science—it has not so far been challenged—will prove to be his discovery of the functions of the nucleolus in fatigue. His final paper, on the Rotatoria, Rhizopoda, and Heliozoa, now in the hands of the printer, will appear posthumously in the *Proceedings* of the Birmingham Natural History and Philosophical Society.

As professor he took his teaching duties extremely seriously. Combining, as he did, crystal lucidity with dramatic brilliance in the lecture theatre, he was indefatigable in helping the individual student at the laboratory bench. He was a warm champion of the woman doctor at the time when girls were generally discouraged from entering the medical profession. The subsequent success of so many of his woman students has abundantly justified his attitude in the early years of the century. His generous appreciation of effort and his zest for life endeared him to many generations of students. More than most men, he had a natural gift for feeling and inspiring affection. He will be much missed. He leaves two sons and a daughter.

LOUIS LAVINE, M.B., M.R.C.P.

Physician, Hull Royal Infirmary

We regret to announce the death on August 28, at the early age of 44, of Dr. Louis Lavine, honorary physician to the Hull Royal Infirmary, who was president of the East Yorkshire Branch of the British Medical Association in 1935–6 and before then had been honorary secretary of the East Yorkshire Division. He represented his Division at the Annual Meeting in Melbourne in 1935 and at Oxford in 1936.

From Hymer's College, Hull, he went to study medicine at Guy's Hospital, and took the English Conjoint qualifications in 1919, after which he served as clinical assistant in the medical unit at Guy's and house-physician at the Hull Royal Infirmary, where he remained for five years before setting up as a consulting physician in Albion Street. He graduated M.B., B.S. of Durham University in 1925 and took the M.R.C.P. in 1926. After election to the visiting staff of the Royal Infirmary he became honorary consulting physician to the Hull Hospital for Women, the Lloyd Hospital, Bridlington, and the Beverley Hospital and Dispensary. Apart from his work as a general physician Dr. Lavine specialized in diseases of the heart and was the first consultant in Hull to install an electrocardiograph. He was also honorary medical referee for the Royal National Hospitals at Ventnor and Bournemouth. He frequently appeared as one of the specialist medical witnesses at the Hull County Court in workmen's compensation cases.

The Services

NAVAL AWARDS

The King has made the following award for courage and devotion to duty during and after bombing attacks:

D.S.C.

Temporary Surgeon Lieut. Andrew George Hegarty, R.N.

Probationary Temporary Surgeon Lieut. Gordon Hepburn Swapp, R.N.V.R. (H.M.S. *Sycamore*), for courageous and efficient services in minesweeping operations in Norwegian waters.

Mentions in Dispatches

Temporary Surgeon Lieut. Eusby Elmes, R.N.V.R., and Probationary Temporary Surgeon Lieut. Donald Norman Leeming, R.N.V.R., have been mentioned in dispatches for courage and devotion to duty during the withdrawals from Boulogne and Calais.

ARMY AWARDS

The King has made the following awards for gallant and distinguished services in action in connexion with recent operations:

Bar to D.S.O.

Temporary Lieut. (acting Lieut.-Colonel) Frederick Arnott Bearn, D.S.O., M.C., R.A.M.C.

D.S.O.

Lieut.-Colonel Angus Hedley Whyte, R.A.M.C., T.A.

Military Cross

Temporary Lieut. Stewart McCallum, R.A.M.C.

The King has made the following awards for distinguished services in the field:

O.B.E. (Military Division)

Lieut.-Colonel (acting Colonel) William Clavering Hartgill, M.C., R.A.M.C.

Major Charles Hugh Clough Byrne, Reserve of Officers, R.A.M.C.

Temporary Lieut. (temporary Lieut.-Colonel) Ronald Ogier Ward, D.S.O., M.C., T.D., R.A.M.C.

M.B.E. (Military Division)

Temporary Lieut. Edward Bernard Brennan, R.A.M.C.

CASUALTIES IN THE SERVICES

Prisoner of War

Lieut. Tom Kenneth Elliott, R.A.M.C.

Medical Notes in Parliament

Speaking in the House of Commons on September 5, Mr. Churchill noted with satisfaction that more than 150,000 beds reserved for casualties had remained empty in our war hospitals for a whole year. In Great Britain during August 1,075 civilians had been killed by enemy action and a slightly larger number had been seriously injured. Mr. Churchill said the arrangements for air raid warnings required considerable changes. Government Departments had been asked to review the whole system. An announcement would be made at latest next week. A committee on street lighting would be set up to see how this lighting could cheer the winter months and at the same time serve the purpose of an alarm.

Mr. Churchill announced on September 5 that on September 17 the House of Commons would discuss the new Government scheme for the physical recreation of young people, and on September 18 the health of the nation, with special reference to national health insurance.

Temporary Medical Officers R.N.

Commander LOCKER-LAMPSON asked on September 5 whether doctors in civilian practice who served in the Navy in the last war would receive priority of appointment on application to join as surgeons. Captain HUDSON replied that the Admiralty, who made appointments of temporary medical officers on the recommendation of the Central Medical War Committee, at present required only young officers, mostly for seagoing appointments in small ships. The rank and responsibilities which newly entered officers were given would not be suitable for medical officers who served in the last war and who now had long service in their profession.

Infant Feeding.—National dried milk will be available only to infants not more than 12 months old for whom a doctor certifies that dried milk is necessary, and will be issued in lieu of one pint of liquid milk. Mr. Boothby can hold out no hope of a subsidy for proprietary infant foods.

Notes in Brief

Mr. MacDonald is arranging with Sir John Anderson for the issue from Government sources of helmets and civilian duty respirators for the use of midwives.

The use of bleachers and improvers in flour for ordinary consumption is not prohibited. As regards flour for Army use such preparation is prohibited by regulations.

In areas of England and Wales where schools are closed arrangements have been made whereby these children can attend schools or centres to receive free or cheap milk. Mr. Ramsbotham says it is not easy to secure the attendance of children for this purpose.

Mr. Cross states that although ship surgeons are not covered by National Maritime Board agreements they as a general rule receive the same monthly war risk money as other officers.

It is the function of medical officers of health in charge of casualty services to arrange for the noting of premises in their area suitable for use by mobile first-aid posts. Instructions to this effect have been issued through the hospital officers of the Ministry of Health, who are in touch with medical officers of health on the matter.

Medical News

The Lord Mayor's Red Cross and St. John Fund for the Sick and Wounded in the War now stands at well over £3,112,000.

Burroughs Wellcome and Co. announce that as a war emergency measure designed to ensure adequate rest for their staff, their business premises will be closed on Saturdays except for the execution of emergency orders by a nucleus staff. It is therefore requested that clients will anticipate as far as possible their week-end requirements to avoid any delay as a result of this arrangement.

A deputation on sex education among the troops was received last week at the War Office by Lord Croft, Under-Secretary of State for War. It was introduced by Lord Horder, who with the Bishop of London and other representatives of the Standing Conference put forward suggestions for supplementing the education given to men and women in the Services on the subject of sex. The Under-Secretary undertook to give full consideration to the points emphasized by the deputation.

A dental ambulance, presented to this country by members of the American dental profession, was formally received on behalf of the Ministry of Health on September 4 at a ceremony on Horse Guards Parade. Dr. C. W. Roberts, making the presentation, asked that it be accepted as a symbol of the willingness of all American citizens to hold out a helping hand to the British people. The ambulance is equipped as an emergency operating room for the immediate treatment of injuries to the face and jaw. It will be manned by a plastic surgeon, a dental surgeon, a dental mechanic, and an anaesthetist. Sir Harold Gillies, consultant adviser in maxillo-facial surgery to the Ministry of Health Emergency Hospital Scheme, accepting the ambulance on behalf of the Ministry, said that it was a most valuable addition to the equipment and efficiency of the maxillo-facial units. Sir Frank Pearce, consulting dental surgeon to Guy's Hospital, expressed the appreciation of the British Dental Association.

The International Assembly of the Inter-State Postgraduate Medical Association of North America will hold its annual meeting at Cleveland, Ohio, from October 16 to 18.

At an inquest in Birmingham on the body of a man aged 62, who was found dead outside a public air raid shelter which contained a watchman's brazier, the coroner, Dr. W. H. Davison, warned the public of the danger of improvising heating in shelters without expert supervision.

According to the *Schweizerische medizinische Wochenschrift* of July 30 there are five million lepers in the world, or 0.25 per cent. of the total population, of whom there are one million in China.

According to the *Journal of the American Medical Association* ankylostomiasis is the most important sanitary problem in a certain zone in the northern part of the Argentine Republic. The greatest obstacle in the eradication of the endemic is that 63% of the houses have no latrine.

Dr. Adolf Meyer, professor of psychiatry of Johns Hopkins University and director of the Henry Phipps Psychiatric Clinic, Baltimore, has been elected president of the United States National Committee of Mental Hygiene.

Dr. David Cheever, associate professor of surgery, Harvard Medical School, has been elected president of the American Surgical Association.

The Minister of Health is allotting £1,000 of the gift of £7,500 made for evacuated children by the Maharaja of Gondal to the relief of children from the Channel Islands.

The Rockefeller Foundation has renewed a grant of $3,000 a year for three years to Duke University in support of a study of the physical chemistry of proteins by Dr. Hans Neurath of the department of biochemistry of the School of Medicine.

Dr. Carlos Mainini has been elected president of the Argentine Medical Association.

No. 34

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended August 24.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	131	6	30	—	8	19	1	12	1	—
Deaths		—	1				—	—		
Diphtheria	829	30	346	28	25	745	60	176	29	28
Deaths	12	1	8	—	1	16	2	3	—	1
Dysentery	40	4	46		2	32	6	18		1
Deaths			—	—	—			1	—	—
Encephalitis lethargica, acute	1	—	—		—	2	—	—		—
Deaths		—	—				1	—		
Enteric (typhoid and paratyphoid) fever	137	6	18	4	—	62	4	6	5	1
Deaths	1	—	—	—	—	1	—	—	—	—
Erysipelas		20	41	4	3			51	7	2
Deaths		—	1				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	33	4	20	9	4	32	5	19	8	6
Measles*	6,688	47	320		1		23	29		1
Deaths	5	1	3	—	—	2	—	—	1	—
Ophthalmia neonatorum	96	5	13	—	1	85	10	20	1	—
Deaths										
Pneumonia, influenzal†	349	21	—	1	4	328	22	2	—	3
Deaths (from influenza)	6	2	—	—	—	15	2	—	—	1
Pneumonia, primary. Deaths‡		19	96	3 5	2		4	115	3 6	7
Polio-encephalitis, acute	9	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	39	—	4		—	34	6	1		—
Deaths		—	—				1	—		
Puerperal fever	1	1	13	4	—	7	7	8	1	1
Deaths		—					—			
Puerperal pyrexia	147	11	17		1	176	24	15		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,257	45	147	42	53	1,170	92	170	49	74
Deaths	—	—	—	—	—	1	—	—	1	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough*	1,056	9	100		8		175	56		15
Deaths	5	1	6	—	—	14	5	2	—	—
Deaths (0-1 year)	266	41	56	21	20	262	43	65	24	17
Infant mortality rate (per 1,000 live births)						42	39			
Deaths (excluding still-births)	3,838	612	514	140	111	3,721	735	541	145	131
Annual death rate (per 1,000 persons living)			10.4	9.3	9.7	9.1	9.4	10.9	9.7	11.5
Live births	5,416	877	819	314	215	6,569	1,116	846	379	211
Annual rate per 1,000 persons living			16.6	21.0	18.8	16.2	14.3	17.1	25.9	18.5
Stillbirths	190	20	31			240	45	42		
Rate per 1,000 total births (including stillborn)			36			36	33	47		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

The incidence of whooping-cough and diphtheria increased and acute poliomyelitis and cerebrospinal fever diminished slightly in England and Wales during the week. Notifications of the last two diseases were in excess of those recorded in 1939.

Comparative figures for whooping-cough are not available, as this disease was not made generally notifiable until late last year, but the smaller number of deaths, 5 against 14, suggests that it is at present less fatal and probably less prevalent; the London figures for cases and deaths for both years certainly support this conclusion, although they cannot be held to prove it. The increase in notifications of whooping-cough in the last four weeks—818, 828, 943, 1,046—suggest a period of abnormal prevalence. Urban and rural districts are, in relation to population, even more affected than highly populated centres: Lancaster 162 (Manchester 29, Liverpool 8, Blackpool 39, Southport 13, Bolton 5, Burnley 3, St. Helens 2, and Salford 1); Stafford 139 (Smethwick 34, Walsall 26, Wolverhampton 18, Stoke-on-Trent 9, Aldridge U.D. 17, Cannock U.D. 6, Uttoxeter R.D. 8); Warwick 98 (Birmingham 90, Solihull U.D. 5); Glamorgan 66 (Cardiff 21, Swansea 5, urban districts of Llwchwr 23, Gelligaer 4, and Penarth 4); Devon 41 (Exeter 3, Plymouth 2, Axminster U.D. 7, Lynton U.D. 4, St. Thomas R.D. 18); Durham 41 (Gateshead 10, South Shields 8, Stockton-on-Tees M.B. 6, Chester-le-Street U.D. 5). In Scotland whooping-cough was entirely restricted to burghs, notably to Greenock 52, Aberdeen 22, Dundee 10, Kirkcaldy 6. In Glasgow and Edinburgh only 2 cases were notified in each. The enteric fevers continue to be rife, but the weekly numbers are falling; although thirty administrative areas are affected, in only four were there over 10 cases—namely, Lancaster 37, Warwick 13, Northampton 13, Northumberland 12, in all counties widely distributed in urban and rural areas.

Cerebrospinal Fever and Acute Poliomyelitis

Although cerebrospinal fever is distributed among thirty-six administrative areas, in none is the disease very prevalent, and in seven only were more than 5 cases notified in the week: Lancaster 14 (Liverpool 2, Manchester 6, Rochdale 1, Wigan 2, Crosby M.B., Lancaster M.B., and Clitheroe R.D. 1 each); Glamorgan 10 (Cardiff 3, urban districts of Gelligaer 1, Penarth 2, and Rhondda 4); Yorks, West Riding, 9 (Leeds 2, and 1 each in the county boroughs of Halifax and Sheffield, in the municipal borough of Brighouse, in the urban district of Conisbrough, Hemsworth, and Otley, and the rural district of Rotherham). In Durham and Warwick there were 8 each and in Gloucester and Southampton 6 each. In Scotland notifications have fallen considerably, and only in Glasgow 10 and Edinburgh 4 were more than 2 cases recorded during the week. Nearly two-thirds of the cases of poliomyelitis occurred in three counties—namely: Stafford 9 (Smethwick 2, Stoke-on-Trent 1, Wolverhampton 5, Tipton M.B. 1); Yorks, West Riding, 8 (Harrogate M.B. 6, Morley M.B. 1, Ripon and Pateley Bridge R.D. 1); Lancaster 7 (Oldham and Southport 1 each, Lancaster M.B. 4, Ormskirk U.D. 1). The 4 Scottish cases were in Glasgow 2, Aberdeen burgh and Bute county 1 each.

The Medical Research Council of Ireland has made the following awards: (1) Dr. Raymond G. Cross: Part-time grant for one year to carry out research work on sterility at the Rotunda Hospital, Dublin, under the Master, and in conjunction with Dr. T. E. T. Bradshaw, the holder of a grant from the Council. (2) Prof. J. Brontë Gatenby: Grant-in-aid for expenses in connexion with an investigation of sterility in man and lower animals on the male side, in conjunction with Mr. George Briggs, M.R.C.V.S.; (3) Prof. J. W. Bigger: Grant-in-aid for one year to enable him to employ an assistant in the School of Pathology, Trinity College, Dublin, in connexion with his investigation of the growth of *B. coli* in water. (4) Miss E. J. Power Steele: Part-time grant extended for a further period of six months from June 1, 1940.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Black Hairy Tongue

"PUZZLED" would be glad if any readers could suggest treatment for a case of black hairy tongue, also furnish any literature on the subject. The condition has been present for nearly a year.

*** The condition known as "black tongue" or "hairy tongue" is described in *Diseases of the Tongue*, by Walter G. Spencer and Stanford Cade (H. K. Lewis and Co., 1931). Bibliographical references are given. Treatment, the authors say, should be directed to removing oral sepsis; the patch may be scraped with cocaine and painted with 2% iodine. In the *Journal of Tropical Medicine and Hygiene* for June 1, 1940 (p. 155) Dr. J. Walker Tomb published a note on the treatment of black hairy tongue (lingua nigra). An ex-service man had developed the condition in India four years before and had been treated at intervals by potassium iodide internally as well as by local applications, but without success. As an experiment it was decided to try potassium chlorate internally (grains 5 in water, t.i.d.), and by the end of ten days the tongue was apparently normal. The treatment was then discontinued for two weeks and resumed again for another ten days. The patient was not seen again for eighteen months, when it was ascertained that there had been no recurrence during that period.

Difficulties after Suprapubic Cystotomy

"H. B." writes: I do not know if anyone could kindly help with advice in the case of a man who has had a permanent suprapubic cystotomy lately for non-malignant prostatic obstruction. He has albuminuria and oedema of the legs and cardiac disease. His constant complaint is that he has to pass urine every hour during the day, and that no urine runs into the rubber bag of the apparatus. At night the urine passes through a tube into a bottle, and he does not have to get up to pass urine through the urethra until 5 a.m. We have tried lengthening the suprapubic catheter, but still no urine passes except per urethram with very little discomfort; but as each occasion, what with buttoning and adjusting and washing, takes ten minutes in each hour the patient naturally has little rest during the day and is unable to get out. If anyone could help I should be very grateful.

Defect of Micturition

Dr. W. GOLDIE (Wolverhampton) writes: I think the answer to your correspondent's query about the man who finds himself unable to express the last few drops of urine at the end of micturition is the answer to the anatomy student's old gag. "What muscles are used to express the last drops of urine?"—namely, the muscles of the fingers. I think that if these are used to press upwards in the perineum and forwards along the urethra the desired result will be obtained.

"FREQUENCY" writes in reply to the inquiry printed on August 31 (p. 306): The late Mr Miller of Edinburgh recommended that after the bladder had been emptied as far as possible the patient should wait for a minute or two before fastening the clothes. Professor Miller stated that in course of time the residual urine was got rid of in quantities ranging from two ounces to half an ounce. Gentle support of the penis is also said to be of service. Small doses of extract. ergot. liquid. are useful.

"Only Functional"

Dr. B. SANDLER (Urmston) writes: "Only Functional" seems to have a typical vasovagal syndrome. He should try, therefore, a mixture of phenobarbitone, belladonna, and ergot. Lieut.-Colonel Crowland's patient, who also has migraine, should also take the same for similar physiological reasons. It would be interesting to note the results.

Income Tax

Depreciation of Cars Laid Up

"W. B." quotes the case of two partners who are on active service and are not using their cars. Can depreciation allowance be claimed?

*** No. The statutory allowance is for depreciation by reason of *wear and tear*, and plant or machinery not in use is not regarded as suffering wear and tear. The present hardship should be compensated for when the cars are replaced, as a greater obsolescence allowance will then be due because of the lesser depreciation allowance received.

First Year of New Partnership

"A. R." acquired a share, as from July, 1939, of a practice in which he was previously working as a salaried assistant. He did *not* acquire an interest in amounts owing to the firm for work done prior to July, 1939. Consequently his cash receipts for his first year as partner were considerably less than his share of the firm's income-tax assessment. On the other hand, the retiring partner receives cash on which he does not pay tax. Is this correct?

*** Yes. It is important to remember that the income-tax assessment is in respect of the earnings of the firm for the year of assessment, though it is calculated according to the cash receipts of the previous year. In the first year of his partnership "A. R." will naturally earn more than he will actually receive, but he is liable on the amount of the earnings, not of the receipts. The same thing would have happened if he had taken over a sole practice. The outgoing partner has already paid income tax on the earnings of the period to which his subsequent receipts relate—they are, so to say, the delayed harvest. He paid tax on them (as "A. R." has to do) as they were accruing, though the measure of his payments was for convenience related to year-by-year cash receipts.

Assistant's Emoluments

"M.R.C.S." is working as an assistant at a weekly salary of £6 plus 30s. for use of car and 35s. for board and lodging. The £9 5s. is paid weekly by cheque. What is his liability?

*** The car allowance is not an emolument and is not chargeable to tax; on the other hand, if the allowable expenses incurred exceed the 30s. per week "M.R.C.S." can deduct the excess. The other payments *are* liable. It is admitted that an assistant who is provided by his principal with board and lodging in such a way that the money or money's worth does not pass into his possession is not liable on the amount of its value, but that class of benefit is an exception to the general rule, and an assistant is in such circumstances more fortunate than other taxpayers.

LETTERS, NOTES, ETC.

Thigh Amputation Retractor

Dr. E. C. DANIEL (Epsom) writes: With reference to Prof. Willan's article in the *Journal* of August 31 (p. 289), he will find in the *Medical Annual*, 1917 (p. 78), an illustration of a "Didier's retractor," and on page 583 a somewhat similar retractor designed by Dr. Collingwood Fenwick. The forms illustrated in the *Medical Annual* have two apertures, and handles. I was, during the last war, working at Horton Hospital, Epsom, and we had one made in the Horton workshop; and if my memory serves me correctly we had two handles as on Didier's, but two *circular* holes as on Fenwick's pattern. It proved a most useful instrument.

Wanted—Books for a Polish Surgeon

A Polish surgeon who served with the Polish Army in Poland and in France is now spending his time of exile in this country by preparing for a British medical qualification. He is badly in need of textbooks, and would welcome gifts or loans of standard textbooks in medicine, surgery, gynaecology and obstetrics, suitable for the Conjoint qualification M.R.C.S., L.R.C.P. The most recent editions would be preferred. Would any reader who is prepared to help communicate with the Editor of the *British Medical Journal*?

Dye Treatment of Blepharitis

Dr. N. PINES (London, E.1) writes: In 1911 I became a clinical assistant to Prof. Gallaemaerts at the Hôpital Saint-Pierre, Brussels. For years he had been using with great success a 1% solution of pyoktanin (methyl violet) in water for blepharitis.